

# City of Chula Vista

## Asset Management Program Technical Advisory Committee

**March 4, 2015**



“above, below, and all around you”

# Agenda

- ◆ Asset Management Goals and Objectives
- ◆ Asset Management Methodology
- ◆ Criticality/Risk Assessment Methodology
- ◆ Life Cycle Cost Methodology
- ◆ Asset Management Systems:
  - Roadway Management System
  - Open Space Management System
  - General Government Management System
- ◆ AMP Tool Demonstration



# Asset Management

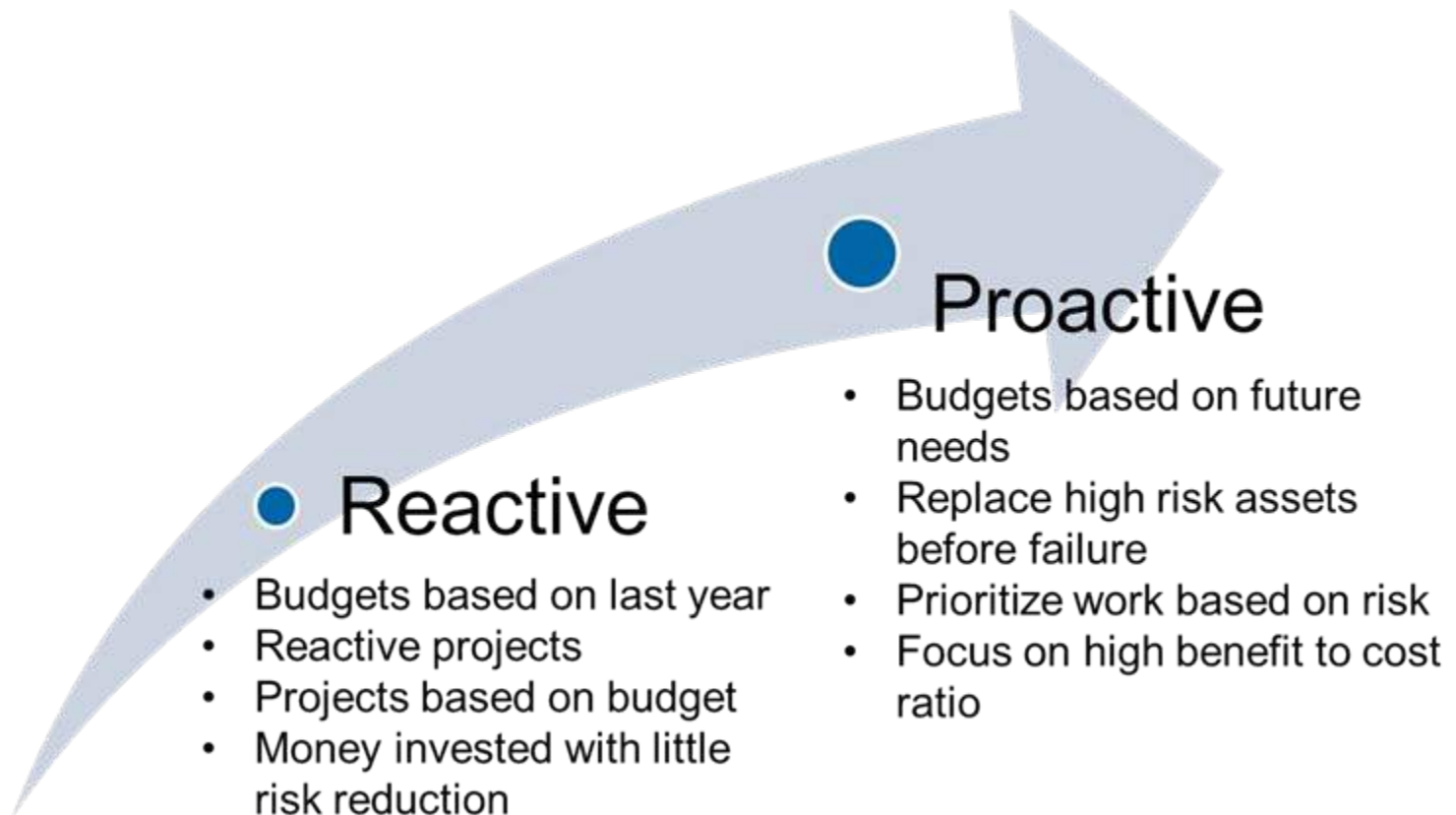
Delivering an established  
**level of service**

while managing individual assets to  
**minimize the life cycle cost**

with an acceptable  
**level of risk**

***Optimized Sustainable Stewardship***

# Effective Asset Management



# Goal of Asset Management

Customer  
Expectations

Cost  
of Service

Level  
of Service

Risk



# Asset Management Program Objectives

- **Catching Up \$**
- **Keeping Up \$**
- **Moving Forward \$**



# Asset Management Program (AMP)



Building Management System	BMS
Drainage Management System	DMS
Fleet Management System	FMS
General Government Management System	GGMS
Open Space Management System	OSMS
Parks Management System	PMS
Roadway Management System	RMS
Urban Forestry Management System	UFMS
Wastewater Management System	WMS

**9 Asset Management Systems for 100 years of investments**

# Asset Management Methodology



# Data Collection Activities



# Condition Assessment



# Asset Mapping



# Documenting What is Managed (Asset Register)

Location	Sub-Location	Asset	Asset ID	Size	Size Unit	Size 2	Size 2 Unit	Quantity	Material	Asset Class	Type	Installation Year	Age	Life	Condition (1 to 5)	CoF	PoF (%)	Condition Comments	Replacement Cost	Additional Comments
Knots Lane	Wet / Dry Well	Wet Well	SLS16005	449.5	CY			1	Reinforced	Well	Wet	1999	14	75	2	5	8.06%		\$ 314,589	
Knots Lane	Wet / Dry Well	Dry Well	SLS16006	1220	CY			1	Reinforced	Well	Dry	1999	14	75	2	5	8.06%		\$ 854,156	
Knots Lane	Wet / Dry Well	Stairway	SLS16007					5	Galvanized	Stairway		1999	14	40	2	2	20.71%		\$ 21,000	
Knots Lane	Wet / Dry Well	Stairway Handrail	SLS16008	64	LF			1	Galvanized	Handrail	Aluminium	1999	14	40	2	3	20.71%		\$ 13,440	
Knots Lane	Wet / Dry Well	Single Leaf Alum. Access Hatch	SLS16009	32	SF			1	Galvanized	Hatch		1999	14	40	2	3	20.71%		\$ 5,000	
Knots Lane	Wet / Dry Well	Alum. Pump Removal Hatch	SLS16010	27	SF			1	Galvanized	Hatch		1999	14	40	2	3	20.71%		\$ 5,000	
Knots Lane	Wet / Dry Well	Manhole Cover and Frame #1	SLS16011	3	Diam.			1	Cast Iron	Manhole Cover		1999	14	75	2	1	8.06%		\$ 1,400	
Knots Lane	Wet / Dry Well	Manhole Cover and Frame #2	SLS16012	3	Diam.			1	Cast Iron	Manhole Cover		1999	14	75	2	1	8.06%		\$ 1,400	
Knots Lane	Wet / Dry Well	Handrail (Pump Removal Hatch)	SLS16013	19	LF			1	Galvanized	Handrail	Aluminium	1999	14	40	2	3	20.71%		\$ 3,990	
Knots Lane	Wet / Dry Well	Supply Fan	SLS16014					1	HVAC			1999	14	20	2	2	58.57%		\$ 4,200	No odor contro
Knots Lane	Wet / Dry Well	Exhaust Fan	SLS16015					1	HVAC			1999	14	20	2	2	58.57%		\$ 4,200	
Knots Lane	Wet / Dry Well	Pump #1	SLS16016	7.5	HP	355	gpm	1		W/V-Pump-S		1999	14	5	5	5	100.00%	Needs to be replaced.	\$ 42,000	*0.6 Hour
Knots Lane	Wet / Dry Well	Inflow Plug Valve with Handwheel Operator	SLS16017	6	Inches			1	Steel	W/V-Valve-L	Plug	1999	14	40	2	5	20.71%		\$ 21,000	*Maintained
Knots Lane	Wet / Dry Well	Outflow Check Valve, Spring Loaded #1	SLS16018	4	Inches			1	Steel	W/V-Valve-S	Check	1999	14	30	2	4	50.00%		\$ 2,100	*Maintained
Knots Lane	Wet / Dry Well	Outflow Plug Valve with Handwheel	SLS16019	4	Inches			1	Steel	W/V-Valve-S	Plug	1999	14	30	2	4	31.88%		\$ 6,160	*Maintained
Knots Lane	Wet / Dry Well	Pump #2	SLS16020	7.5	HP	355	gpm	1		W/V-Pump-S		1999	14	5	5	5	100.00%	Needs to be replaced.	\$ 42,000	*0.6 Hour
Knots Lane	Wet / Dry Well	Inflow Plug Valve with Handwheel Operator	SLS16021	6	Inches			1	Steel	W/V-Valve-L	Plug	1999	14	40	2	5	20.71%		\$ 21,000	*Maintained
Knots Lane	Wet / Dry Well	Outflow Check Valve, Spring Loaded #2	SLS16022	4	Inches			1	Steel	W/V-Valve-S	Check	1999	14	30	2	4	31.88%		\$ 2,100	*Maintained
Knots Lane	Wet / Dry Well	Outflow Plug Valve with Handwheel	SLS16023	4	Inches			1	Steel	W/V-Valve-S	Plug	1999	14	30	2	4	31.88%		\$ 6,160	*Maintained
Knots Lane	Generator & Control	Generator & Control Room Building	SLS16024	190	SF			1	CMU	Non-office		1999	14	60	2	4	11.27%		\$ 23,750	*2 x 3' x 4' Louver
Knots Lane	Generator & Control	Flow Meter	SLS16025	6	Inches			1		Flow Meter		2013	0	25	3	2	50.00%		\$ 15,000	*K-factor: 0.9792/
Knots Lane	Generator & Control	Bubbler Control System	SLS16026					1		Electric Panel		1999	14	20	2	5	58.57%		\$ 10,000	*Wetwell level
Knots Lane	Generator & Control	Security System	SLS16027					1		Electric Panel		1999	14	20	2	5	58.57%		\$ 10,000	
Knots Lane	Generator & Control	Telemetry	SLS16028					1		SCADA		1999	14	5	2	3	100.00%		\$ 140,000	
Knots Lane	Generator & Control	Switchboard "SE"	SLS16029					1		Electric Panel		1999	14	20	2	5	58.57%		\$ 10,000	
Knots Lane	Generator & Control	Transfer Switch (ATS)	SLS16030					1		Electric Panel		1999	14	20	2	5	58.57%		\$ 10,000	
Knots Lane	Generator & Control	Main Control Panel (MCP)	SLS16031					1		Electric Panel		1999	14	20	2	5	58.57%		\$ 10,000	*Pump on/off
Knots Lane	Generator & Control	Generator	SLS16032					1		Generator		1999	14	30	2	5	31.88%		\$ 84,000	*Generator main
Knots Lane	Generator & Control	Generator Diesel Tank	SLS16033	137	Gal			1		Tank	Diesel	1999	14	30	2	2	31.88%		\$ 14,000	
Knots Lane	Generator & Control	MCC	SLS16034	208	V			1		MCC		1999	14	20	2	5	58.57%		\$ 210,000	CAT. NO. 658/
N. Batiquitos	Site	Paving		5050	SF			1	Asphalt	Pavement-AC		1998	15	50	2	1	16.43%		\$ 353,500	condition. UV radi
N. Batiquitos	Site	Outdoor Lighting #1 (South East)						1		Lighting		1998	15	30	2	1	35.36%		\$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #2 (North East)						1		Lighting		1998	15	30	2	1	35.36%		\$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #3 (South West)						1		Lighting		1998	15	30	2	1	35.36%		\$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #4 (North West)						1		Lighting		1998	15	30	2	1	35.36%		\$ 4,900	

# Asset Valuation

Building Management System



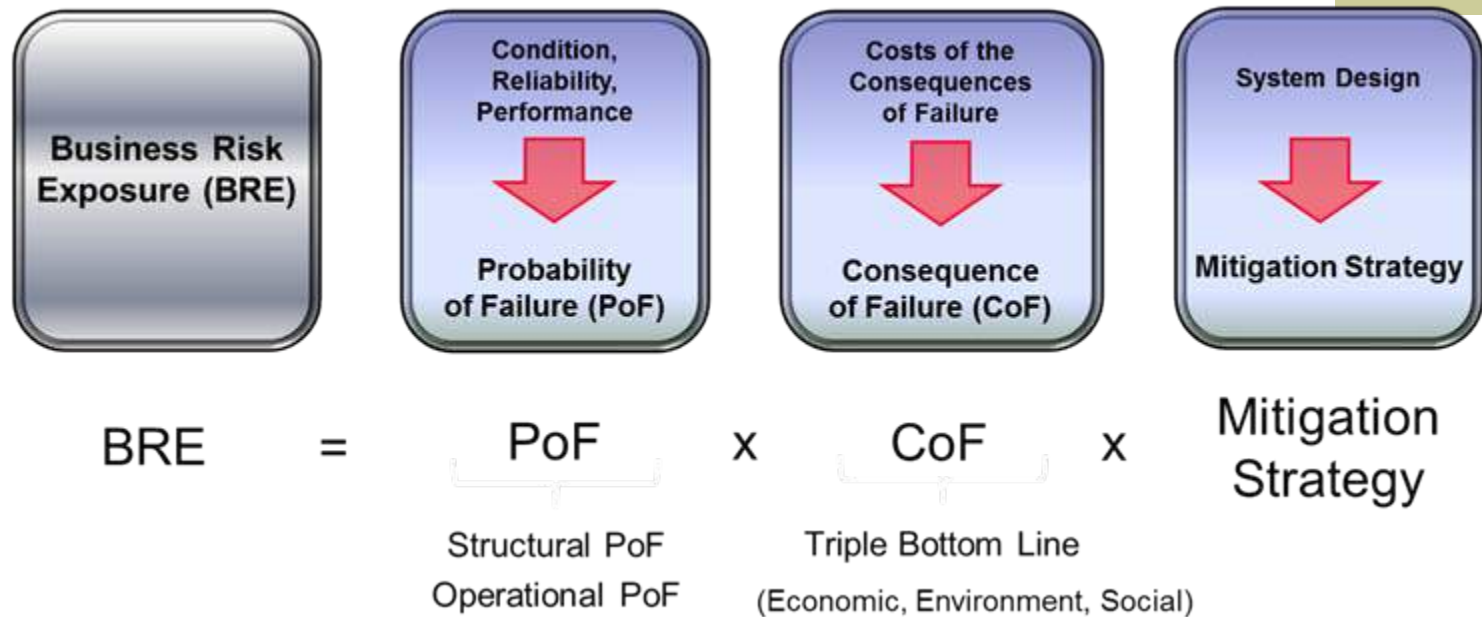
Boys and Girls Club, \$3,944,795	Chula Vista Woman's Club, \$530,130	Civic Center Library, \$8,465,353	Heritage Park Recreation Center, \$1,021,971	Lauderbach Recreation Center, \$1,199,185
Loma Verde Recreation Center, \$5,486,758	Monteville Recreation Center, \$3,587,642	Norman Park Senior Center, \$3,337,311	Parkway Community Recreation Center, \$5,226,132	
Salt Creek Park Recreation Center, \$2,179,195	South Chula Vista Library, \$6,159,706	Veteran Park Recreation Center, \$2,575,852	YMCA, \$1,342,040	

# Asset Criticality

## Criticality Methodology

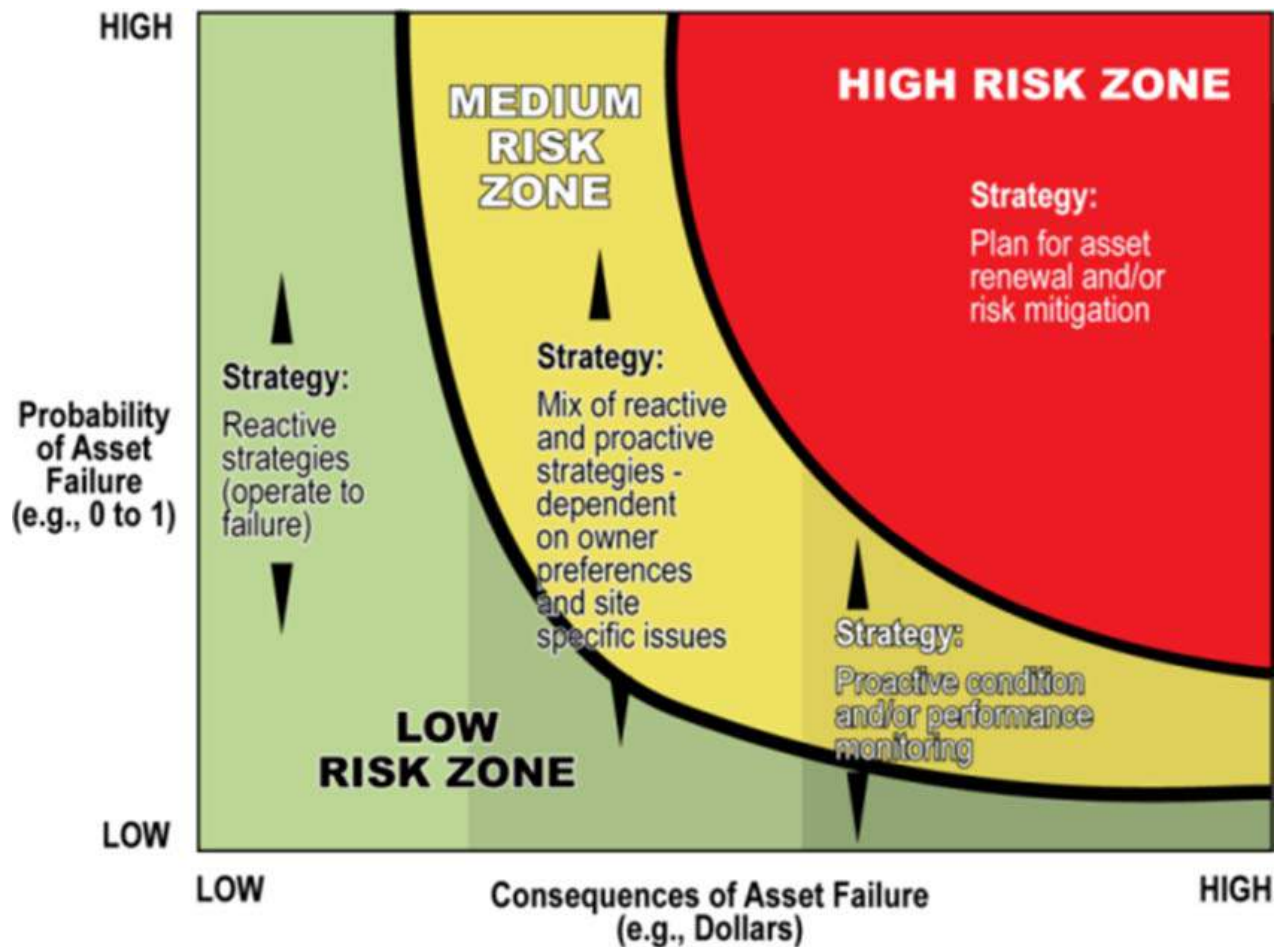
- By asset type and location
  - Type
  - Usage
  - Location
- By asset class
  - Example:
    - ◆ Playground
    - ◆ Sports courts

# Risk



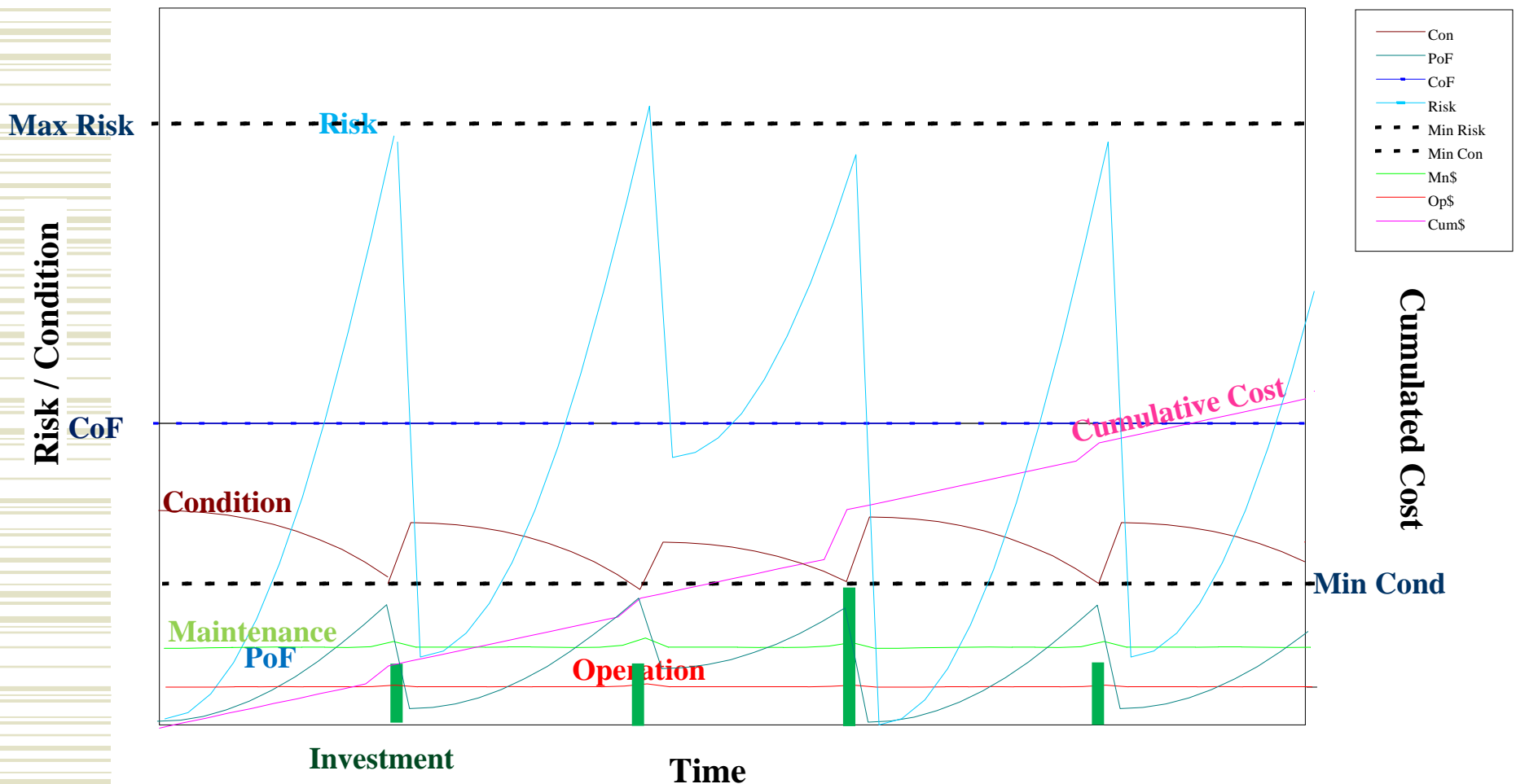
- ◆ Where PoF is driven by failure modes
  - Physical Mortality (age)
  - Capacity
  - Levels of Service
  - Financial Efficiency (life cycle cost)

# Management Strategy (Risk-Based)

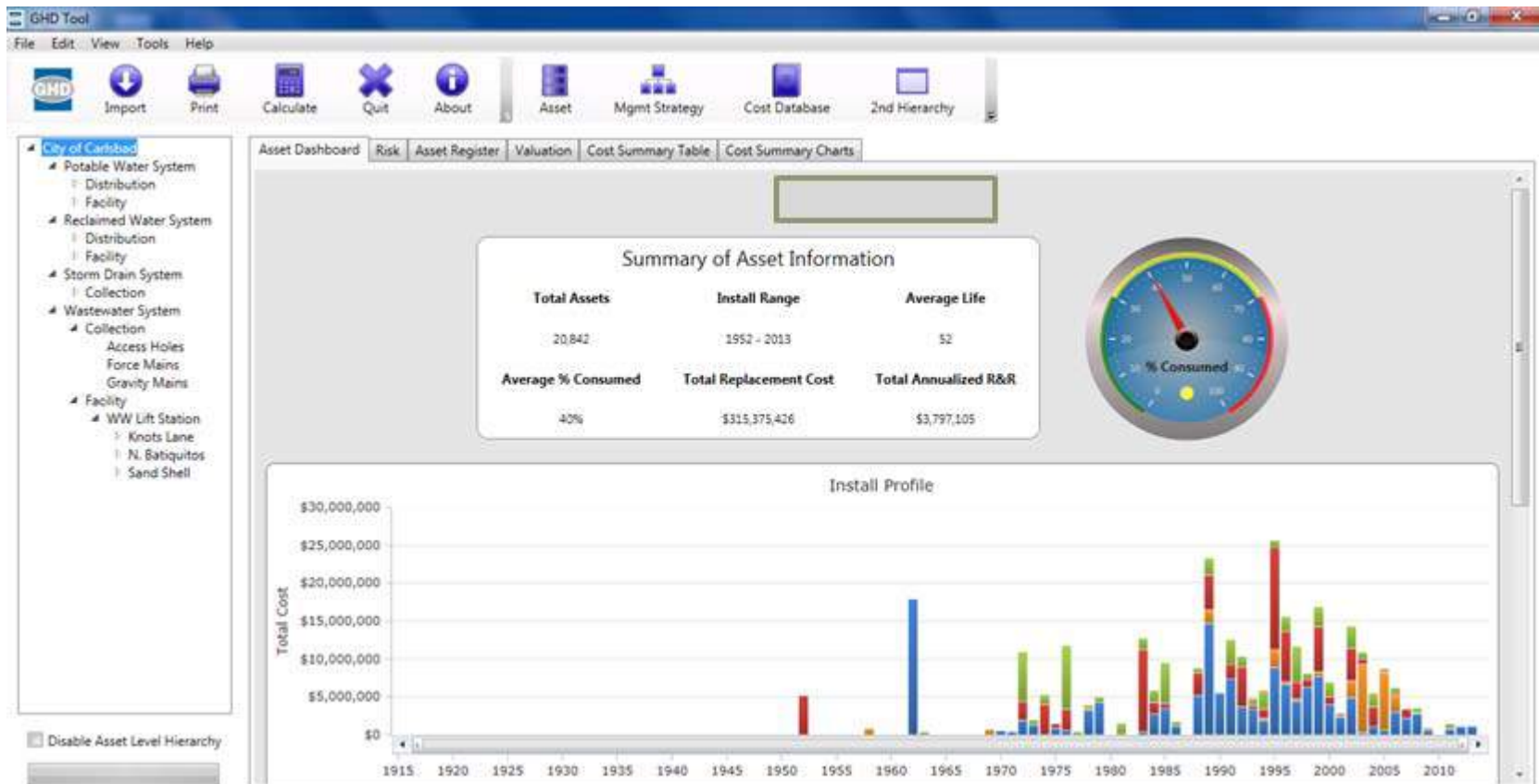




# Asset Life Cycle Investment Logic

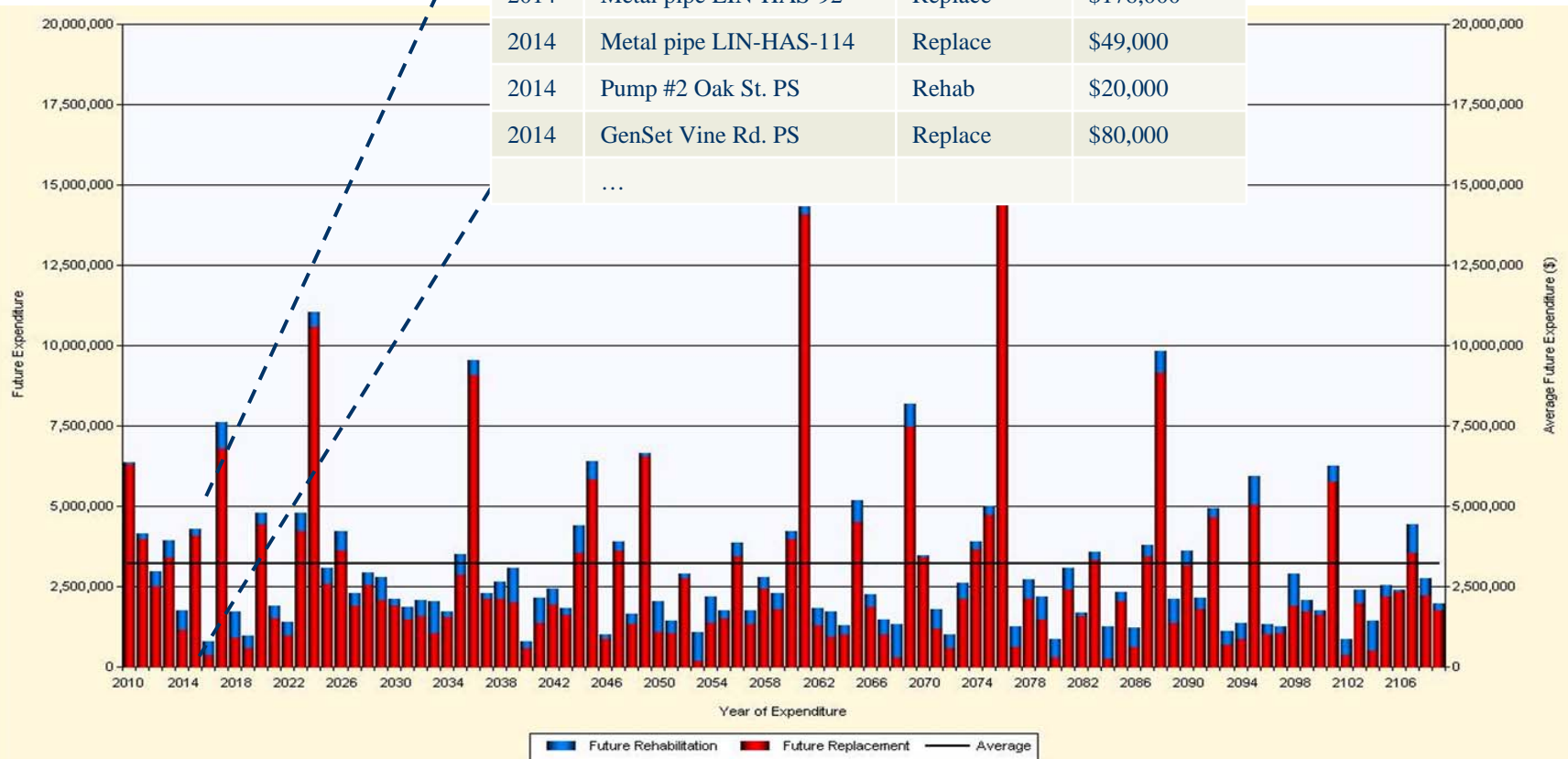


# Asset Management Tool



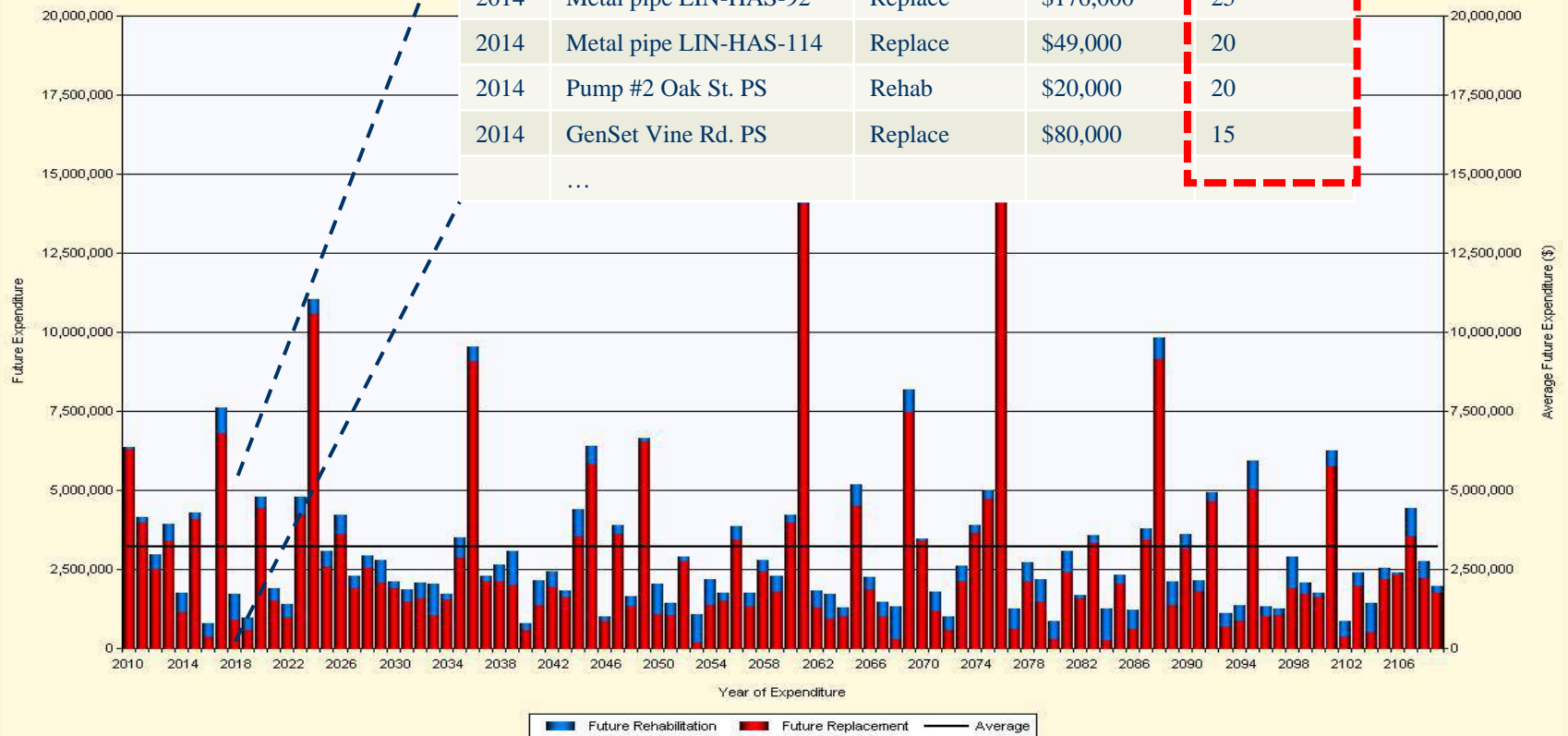
# Understanding the Need (Year By Year, Asset By Asset)

Year	Asset Name	Action Type	Action Cost
2014	Metal pipe LIN-HAS-78	Replace	\$340,000
2014	Metal pipe LIN-HAS-92	Replace	\$176,000
2014	Metal pipe LIN-HAS-114	Replace	\$49,000
2014	Pump #2 Oak St. PS	Rehab	\$20,000
2014	GenSet Vine Rd. PS	Replace	\$80,000
	...		



# Risk-Based Prioritization

Year	Asset Name	Action Type	Action Cost	Risk Score
2014	Metal pipe LIN-HAS-78	Replace	\$340,000	25
2014	Metal pipe LIN-HAS-92	Replace	\$176,000	25
2014	Metal pipe LIN-HAS-114	Replace	\$49,000	20
2014	Pump #2 Oak St. PS	Rehab	\$20,000	20
2014	GenSet Vine Rd. PS	Replace	\$80,000	15
...				



A decorative graphic on the left side of the page consists of a series of thin, horizontal, light green lines. To the right of these lines, there are two vertical bars: a taller one on the left and a shorter one on the right, both in a medium green color. A dark blue horizontal line spans the width of the page, positioned above the word 'ROADWAY'. Another dark blue horizontal line is positioned below the word 'ROADWAY', starting from the center and extending to the right, where it is capped by a short, thick, medium green horizontal bar.

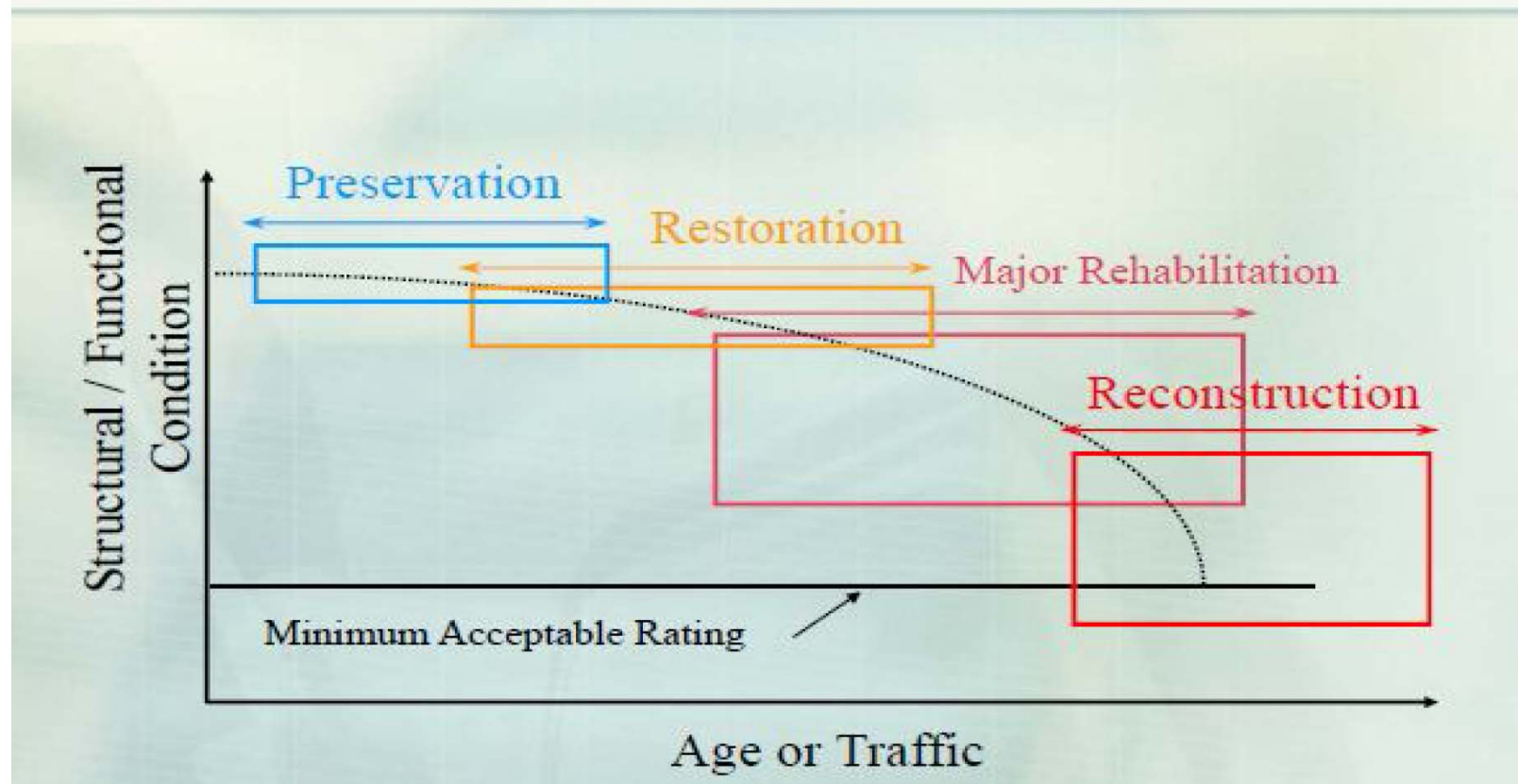
**ROADWAY**

# Roadway Assets

- ◆ Bridge
- ◆ Curb & Gutter
- ◆ Driveway Approach
- ◆ Guardrail
- ◆ Median
- ◆ Parking Lot
- ◆ Parking Meter
- ◆ Parkway
- ◆ Pavement Striping and Marking
- ◆ Pedestrian Ramp
- ◆ Sidewalk
- ◆ Traffic Sign
- ◆ Traffic Signal System
- ◆ Street Lighting

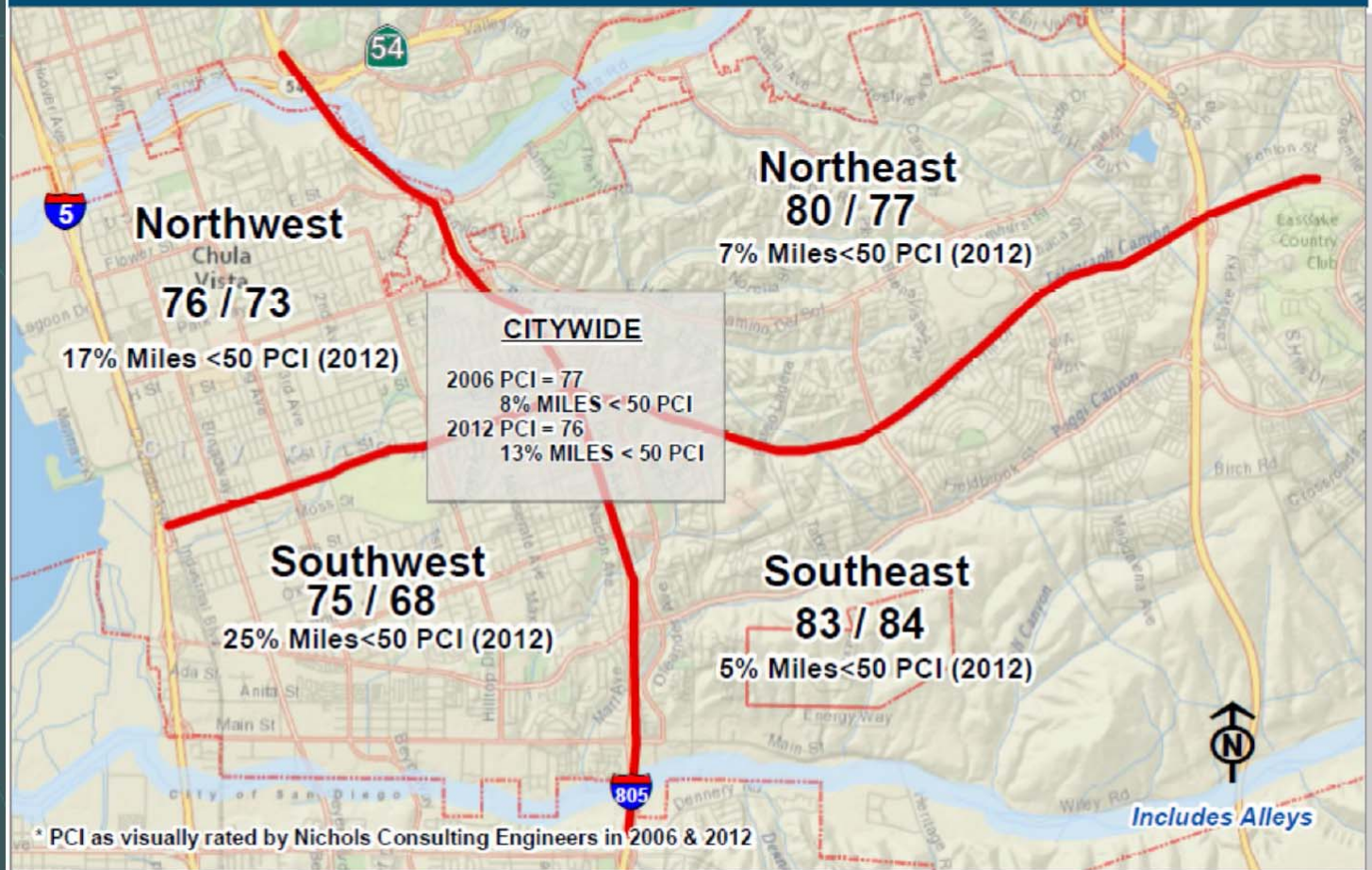
# Pavement

## Typical Pavement Performance Curve



# PCI MAP – 2012 & 2006

## PCI MAP 2006 PCI / 2012 PCI\* - AVERAGE BY AREA





# *“Pay Now or Pay More Later”*

## Pavement Condition

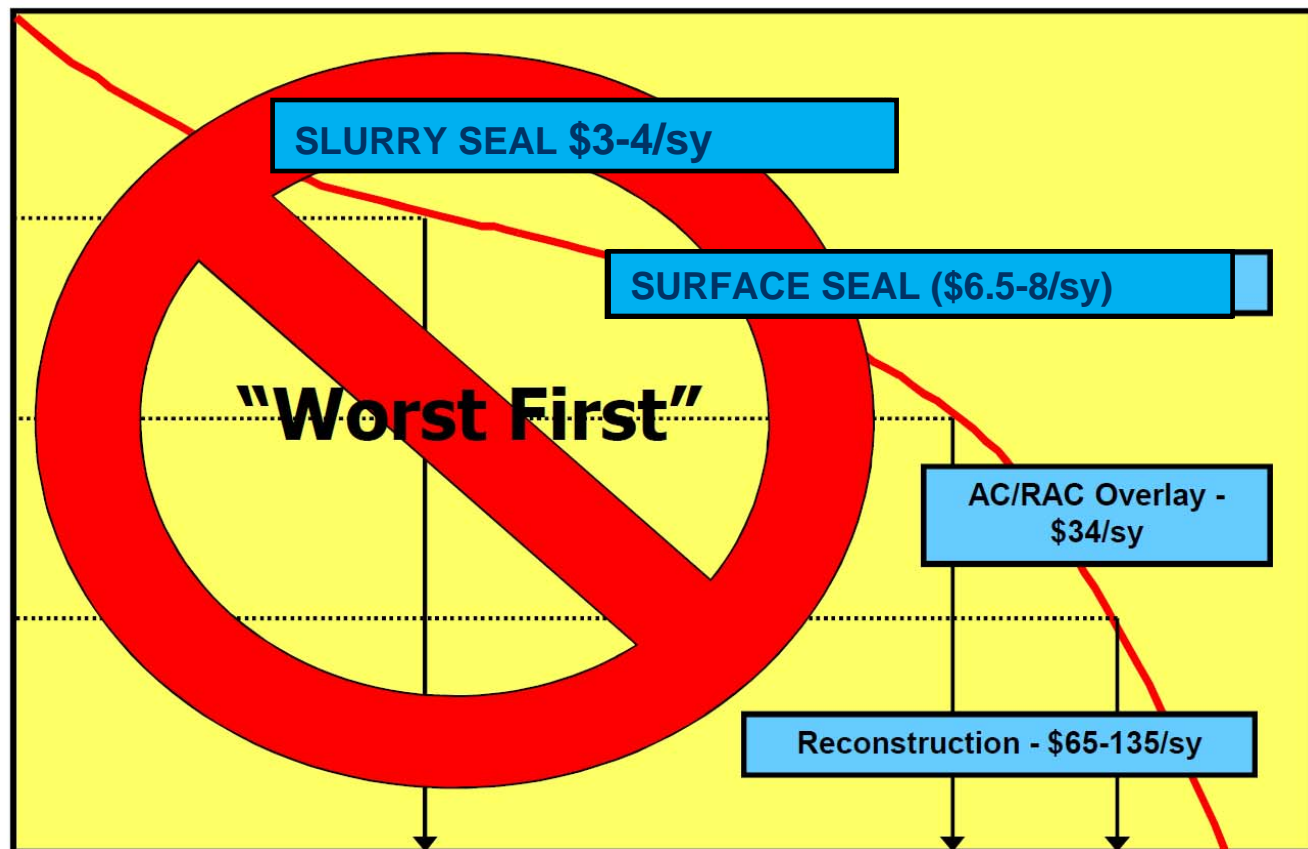
Excellent

Good

Fair

Poor

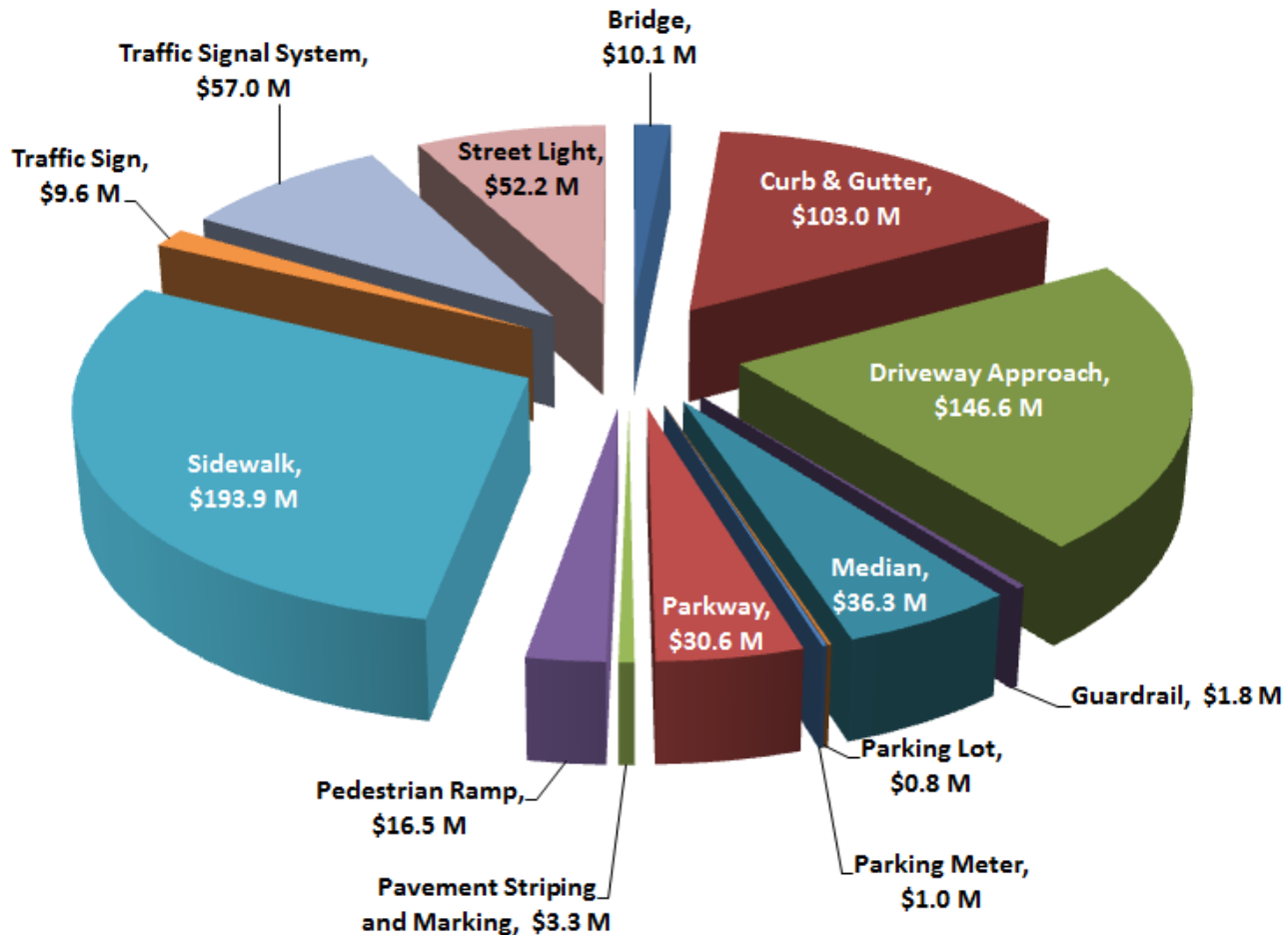
Very Poor



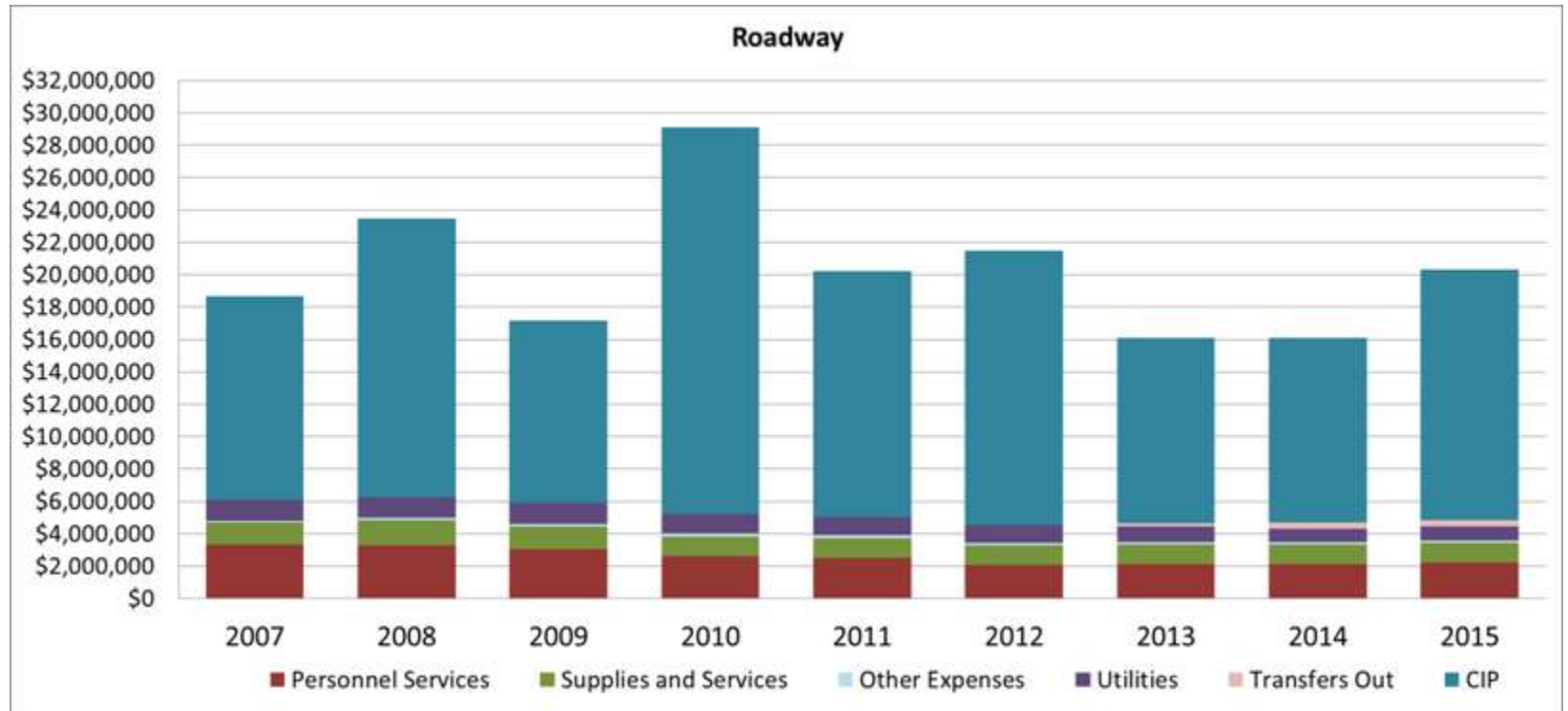
Time

# Roadway Valuation

**Total: \$662.5 M**



# Historical Budget



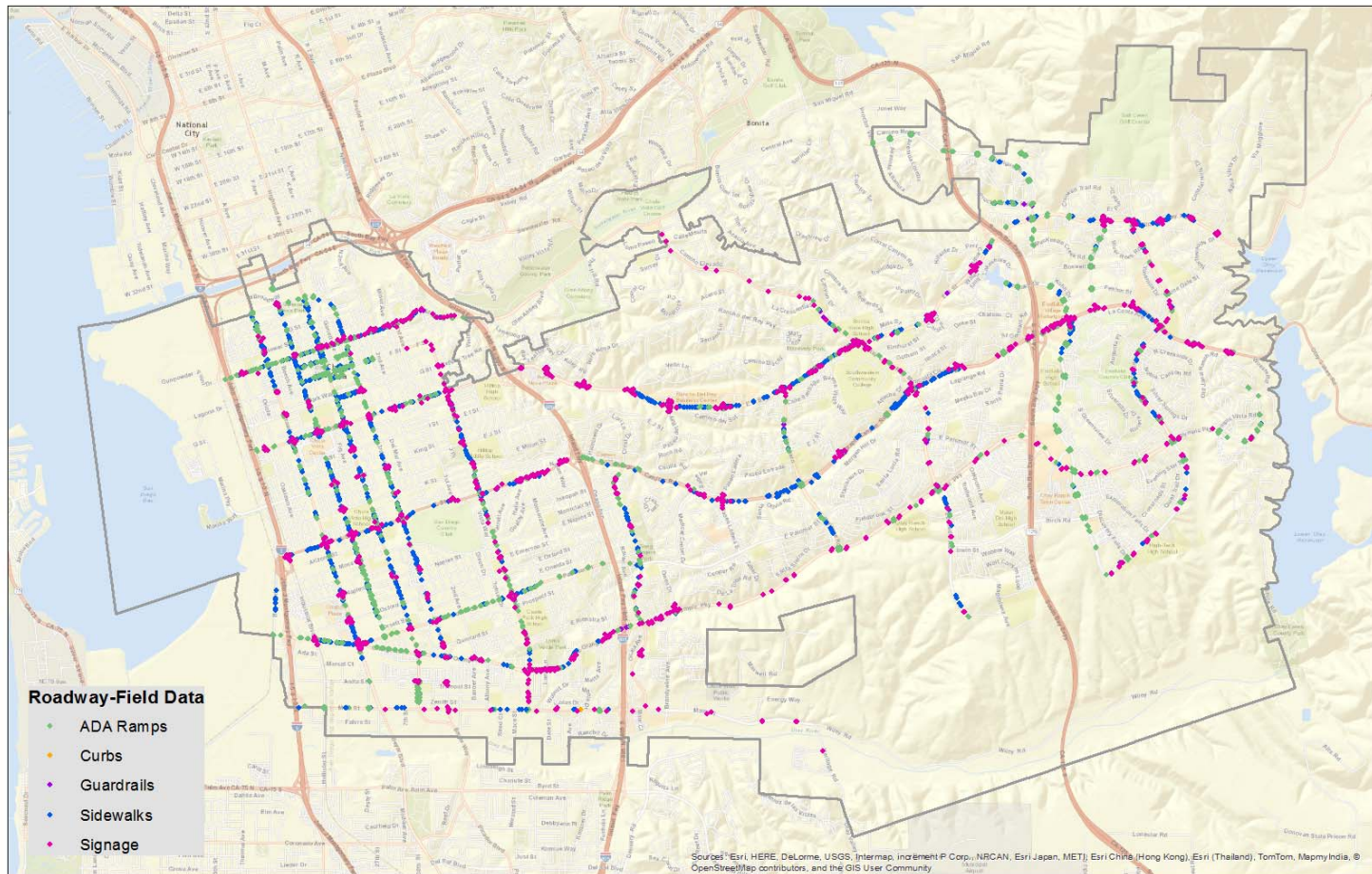
# Asset Inventory



# Condition Assessment / ADA Compliance



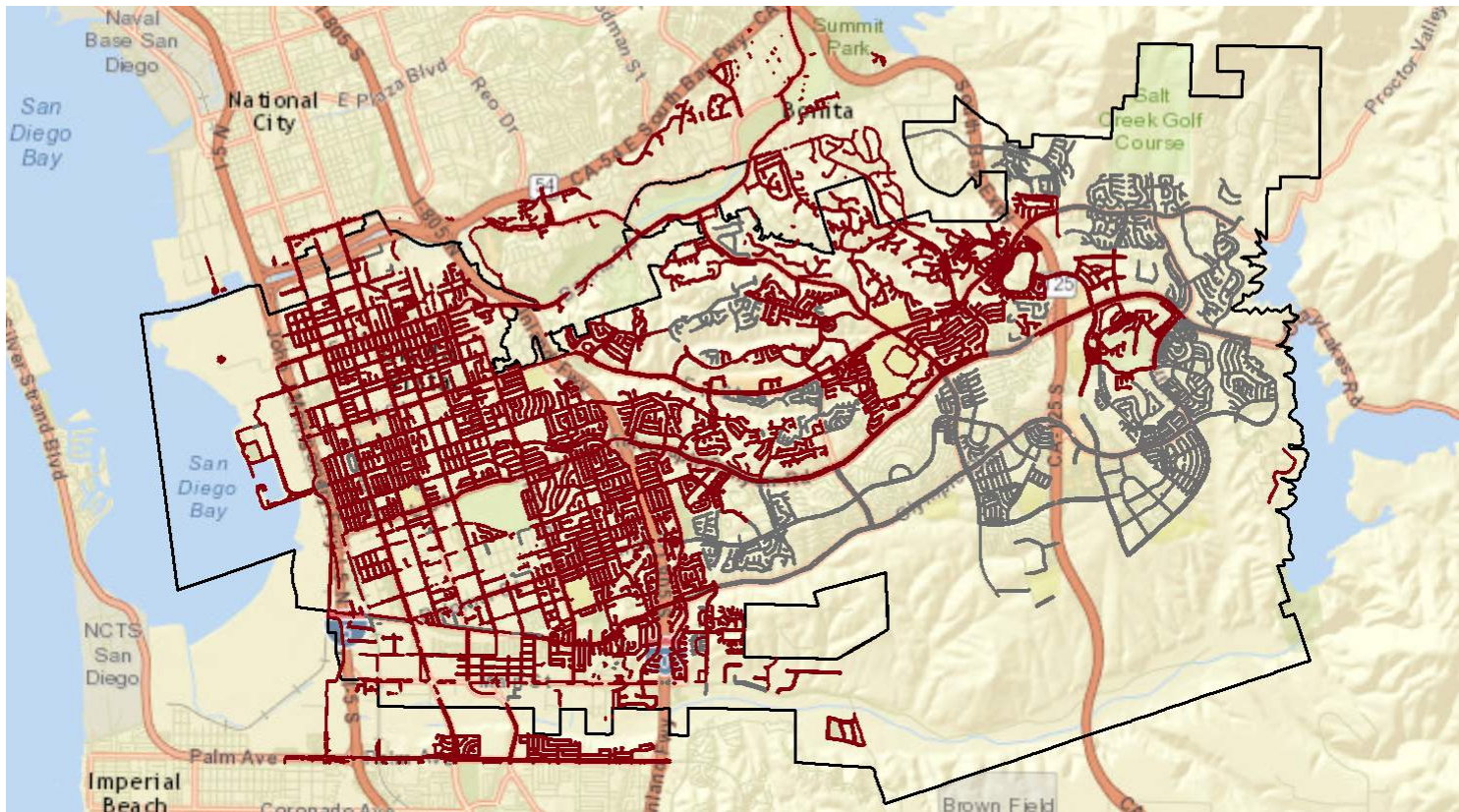
# Field Assessment



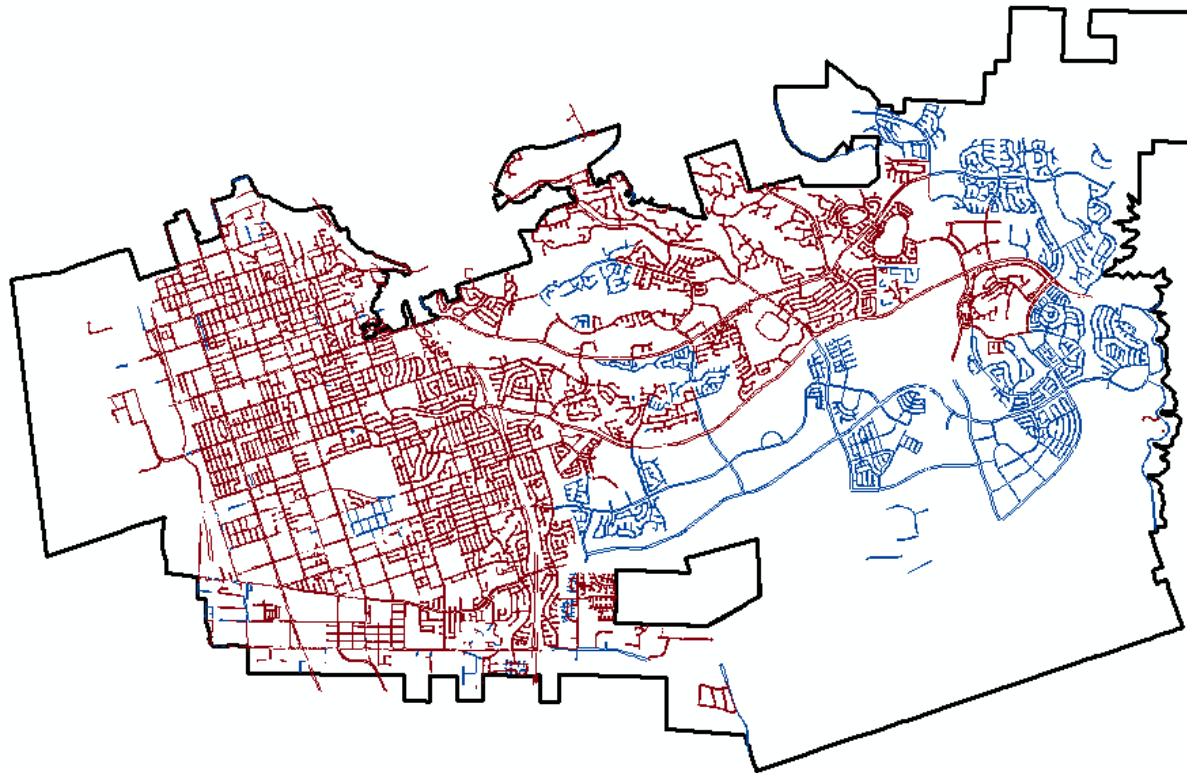
# Asset Inventory

Asset Type	Inspected (count)	Inspected (mile)
Traffic Signs	1200	
ADA Ramps	1227	
Sidewalks		150 miles of roadway system
Guardrails		7 miles
Curb & Gutter		150 miles of roadway system
Medians		40 miles
Pavement Striping & Markings		150 miles of roadway system
Street Lights	450	
Parking Lots	11	
Parking Meters	380	

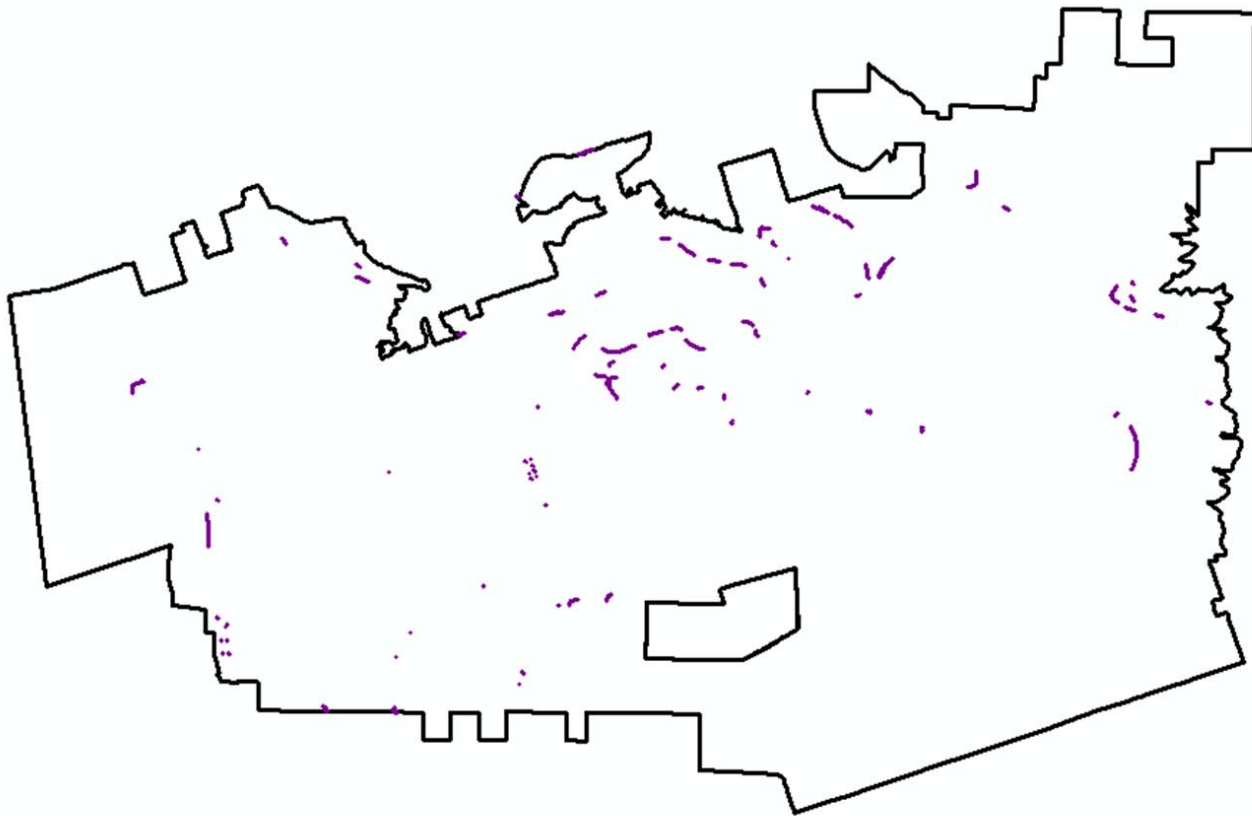
# Sidewalk Inventory



# Asset Inventory: Curb & Gutter



# Asset Inventory: Guardrails



# Asset Inventory: Parking Meters



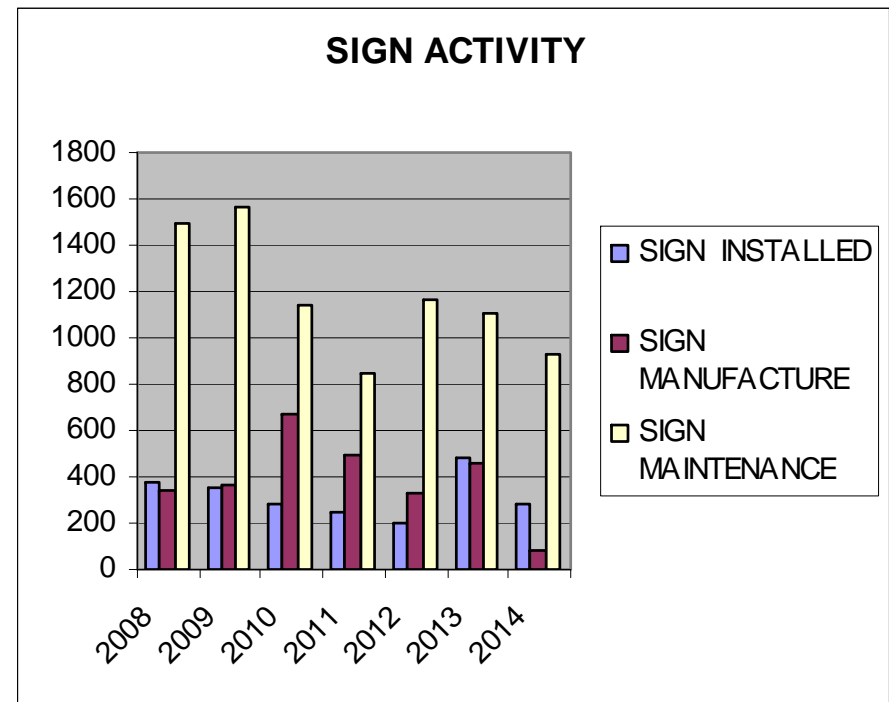
# Sign Assessments

- ◆ 28,242 Signs Citywide



# Sign Maintenance Installation and Manufacture

- ◆ Sign crew consisting of two persons installs and maintains on average 1338 signs per year
- ◆ Currently sign shop manufactures on average 484 new signs a year
- ◆ Over the last few years demand has increased in both areas

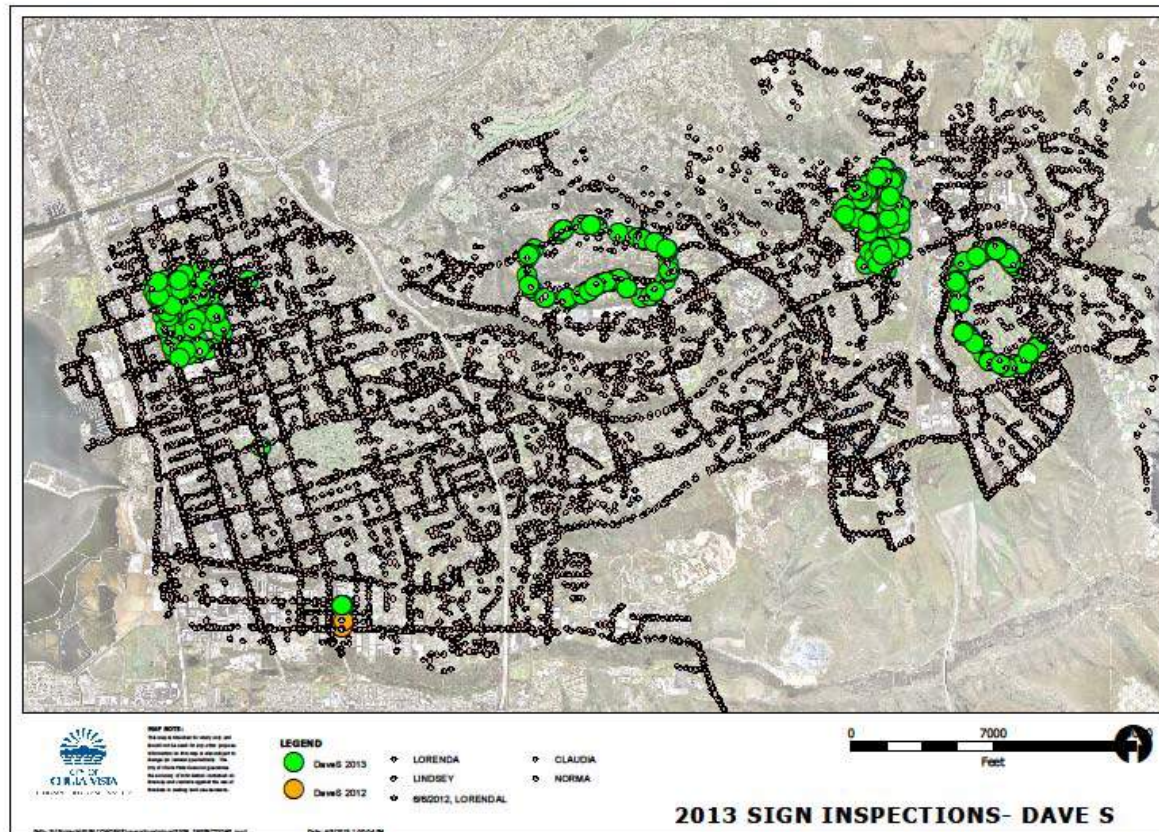


# Sign Reflectivity

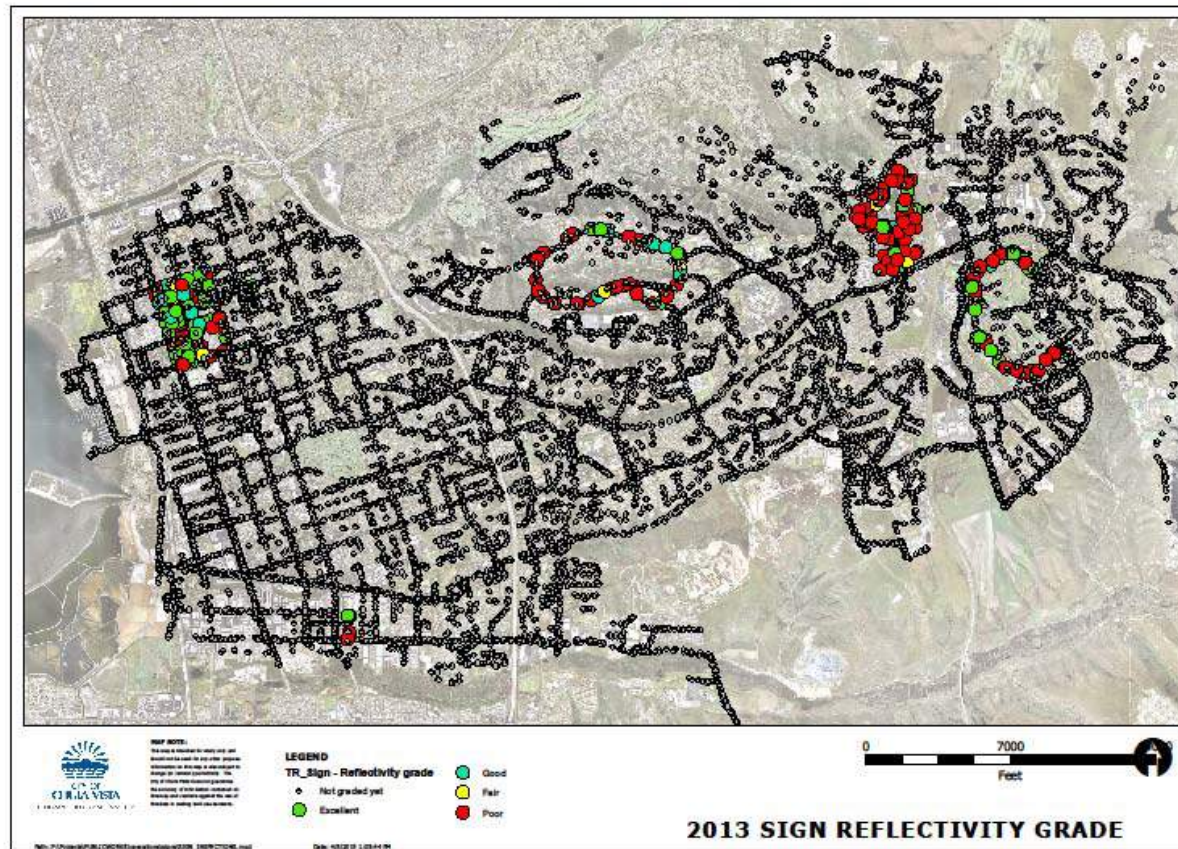
- ◆ 638 signs measured to determine if they meet mandated reflectivity standards
  - Sampled areas in each of the four quadrants of the City
  - 247 signs fell below the mandated reflectivity level – a **39% failure rate**
  - Estimated 9,157 non-compliant signs city-wide



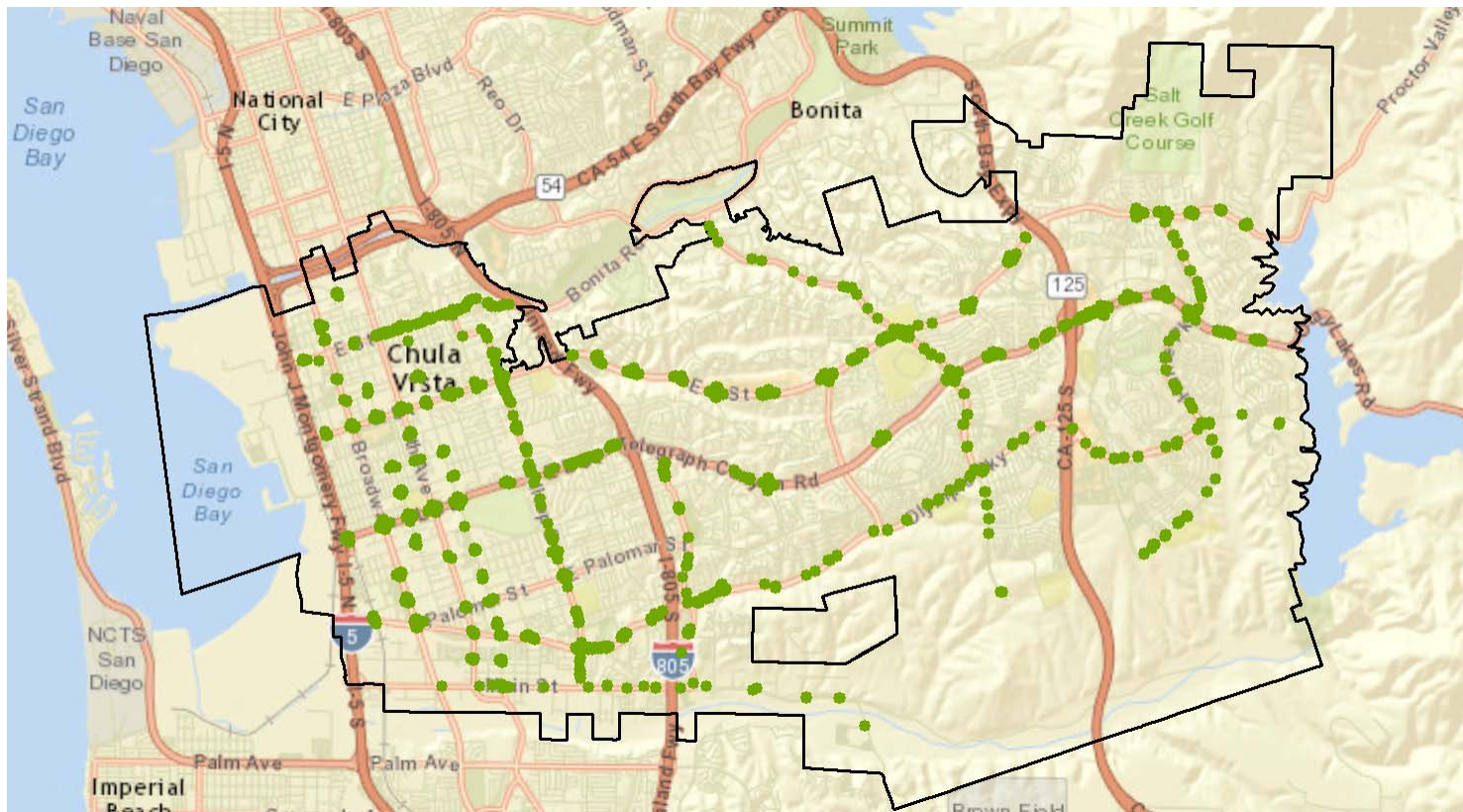
# Sampled Areas



# Sign Reflectivity



# Signage Condition Assessment



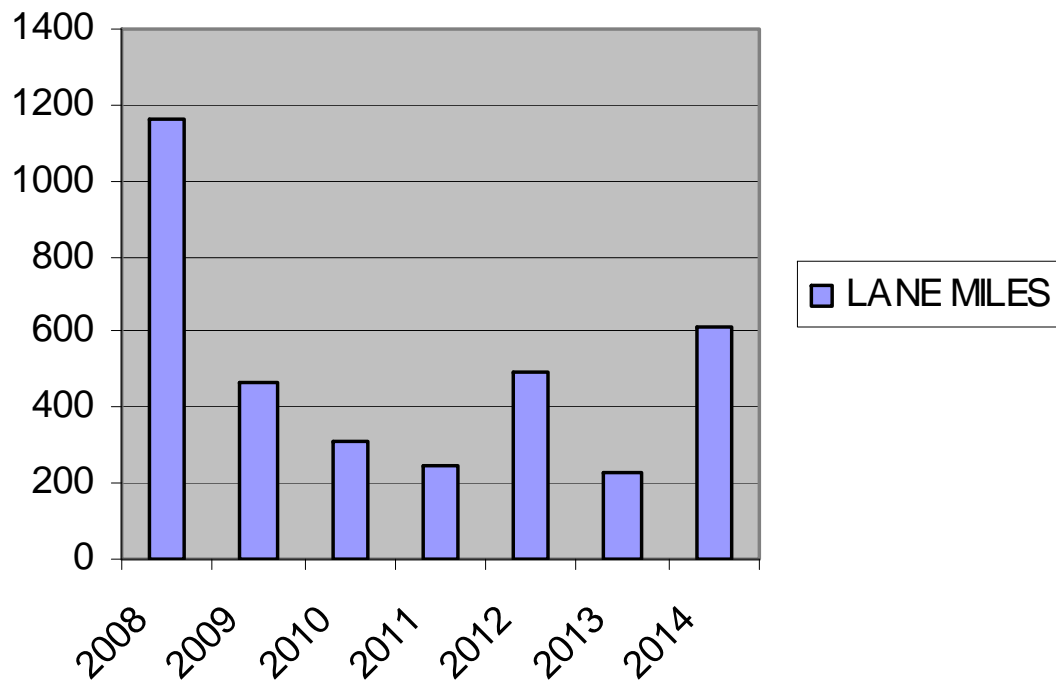
# Traffic Sign Inspection Results

- Average age of inspected signs is 8 years
- Of all signs inspected, 71% passed retroreflectivity requirements

Sign Type	Expected Life
Black on Orange	10 years
Black on White	10 years
Black on Yellow	10 years
White on Green	10 years
Red on White	10 years
White on Red	10 years

# Striping

## STREET STRIPING



# How Are We Doing Now?



- ◆ 43% of lane lines are arterials or collectors
- ◆ From 2009 thru 2013 on avg. only 350 lane miles have been restriped
- ◆ In 2014 striping doubled to 615 lane miles including residential restriping
- ◆ Currently 85% of all lane lines city wide were restriped in 2014 (including striping done under capital improvement projects)

# Pavement Marking Assets

- ◆ Approx. 6500+ pavement legends such as stop and bars, arrows, speed limits, etc.
- ◆ Approx. 55,000+ linear feet of crosswalks and limit lines



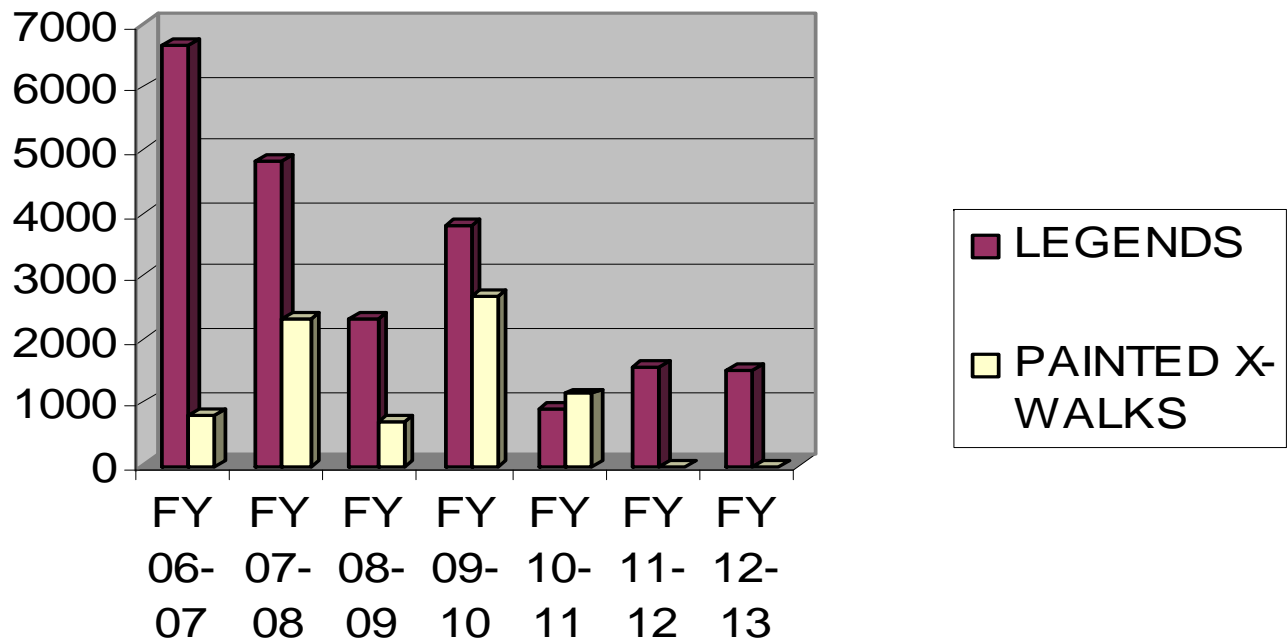
# What Gets Repainted?



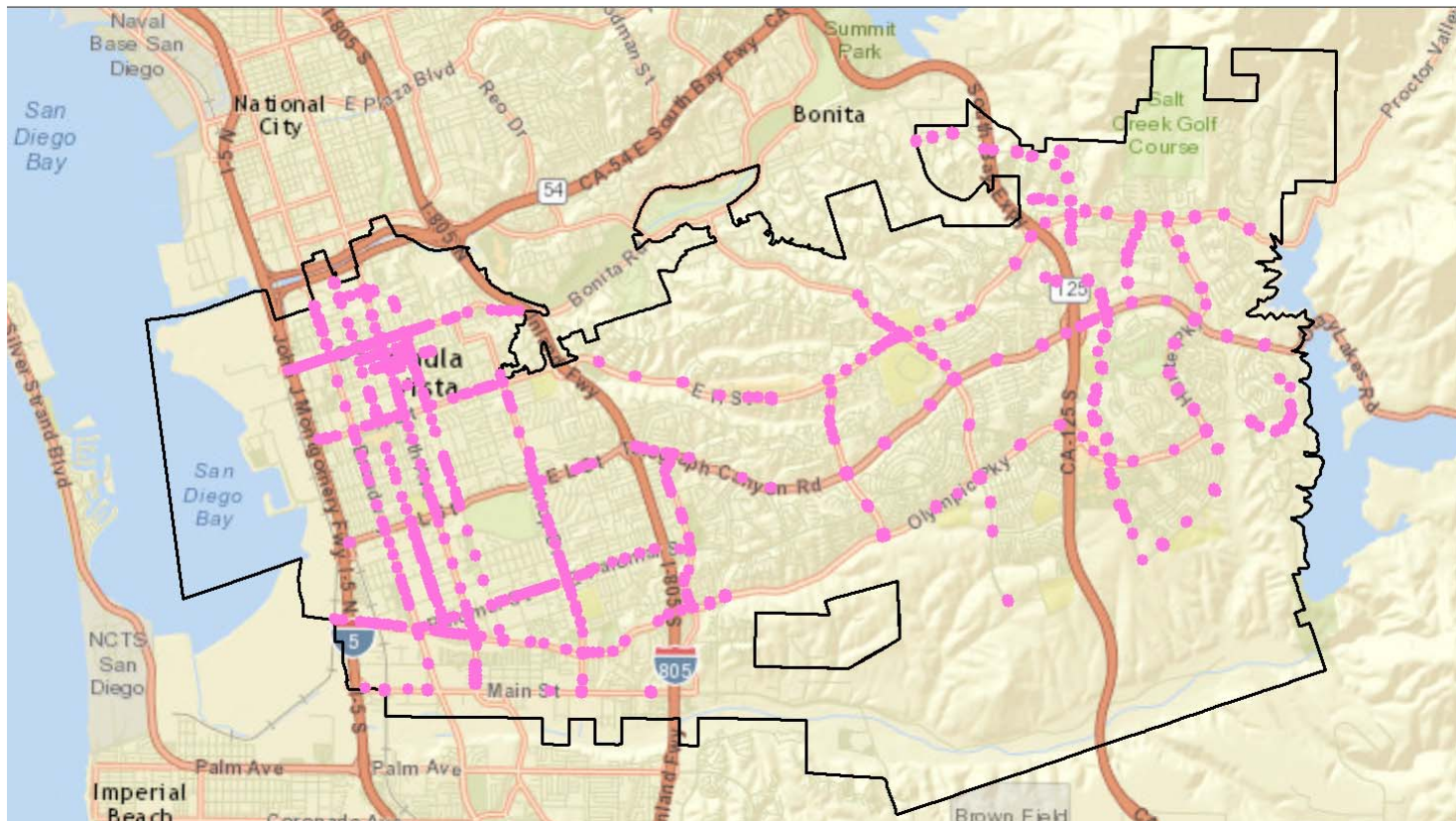
- ◆ Over the last 7 years 35% of legends have been converted to plastic
- ◆ Thermoplastic has a life of approx. 5 years.
- ◆ 35% of the 4333 painted pavement marking are repainted
- ◆ Over the past 5 years stops and bars and speed limits have been concentrated on
- ◆ Over the last 2 years only a limited amount of crosswalks redone

# Reduction in Repainting of Pavement Markings

## 16723 LEGENDS & X-WALKS

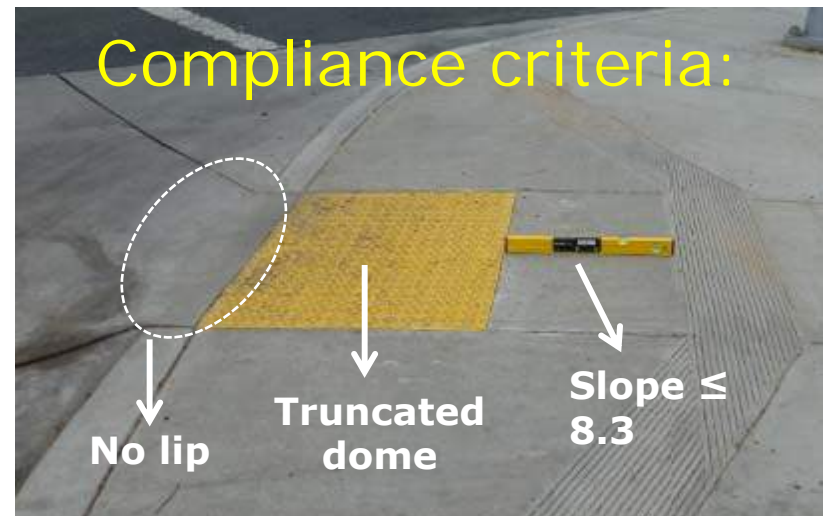


# ADA Ramp Assessment



# ADA RAMPS

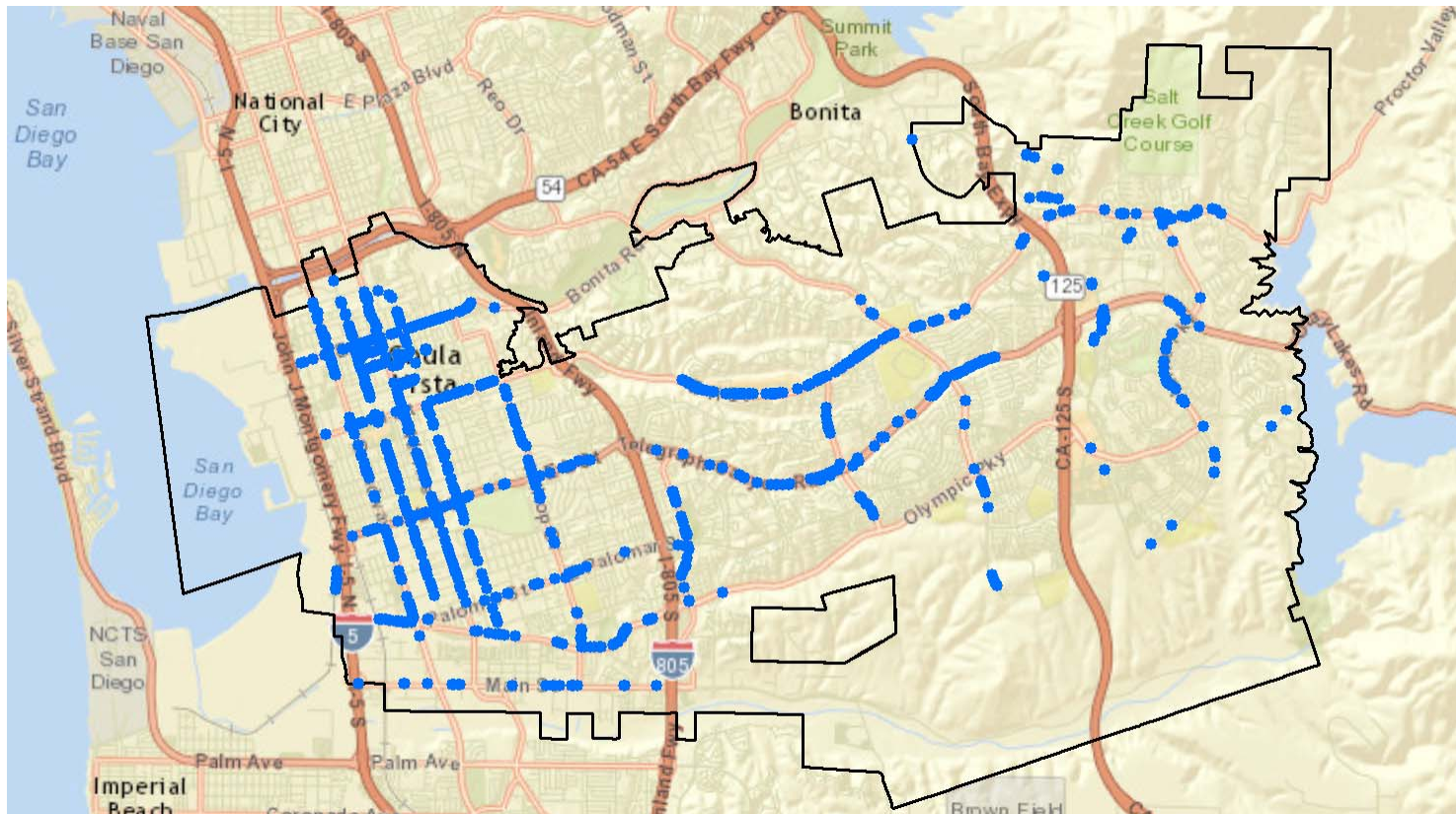
- 1,227 ADA ramps inspected
- 528 new ramps have been added to existing inventory
- Results:
  - 31% are fully compliant
  - 19% are partially compliant (missing 1 criteria)
  - 47% only meet slope criteria
  - 3% are non-compliant



# Sidewalks



# Sidewalk Assessment

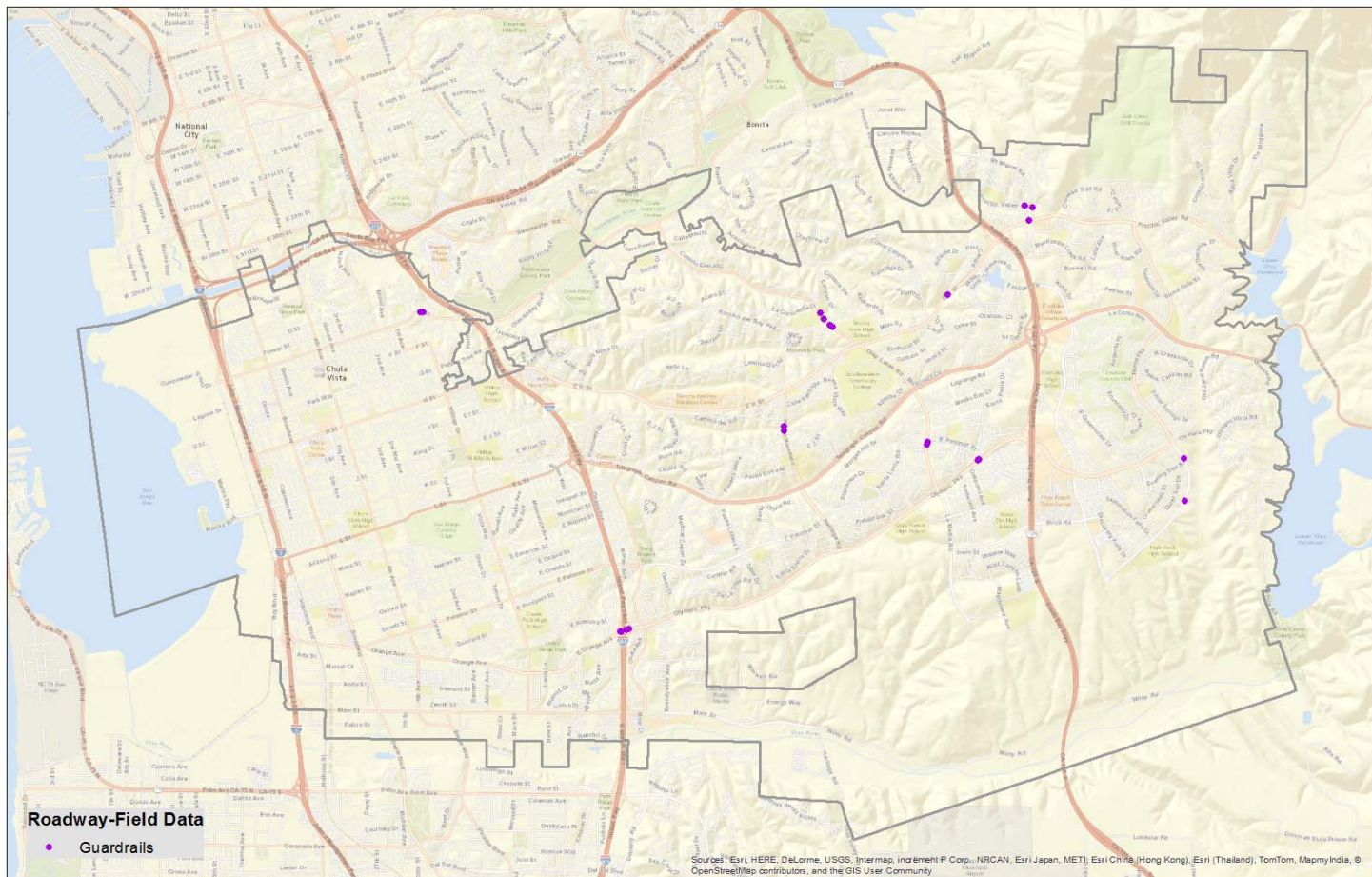


# Sidewalks

- 70 miles of sidewalks inspected
- Within the inspected sidewalks, there are 1,070 locations of trip hazards (uplift  $\geq 0.25$  in)
  - 63% are  $\geq 0.5$  in
  - 29% are  $\geq 1$  in
  - 7% are  $\geq 2$  in
- Most uplifts are due to close proximity to trees
  - Install root barrier when planting new trees



# Guardrails

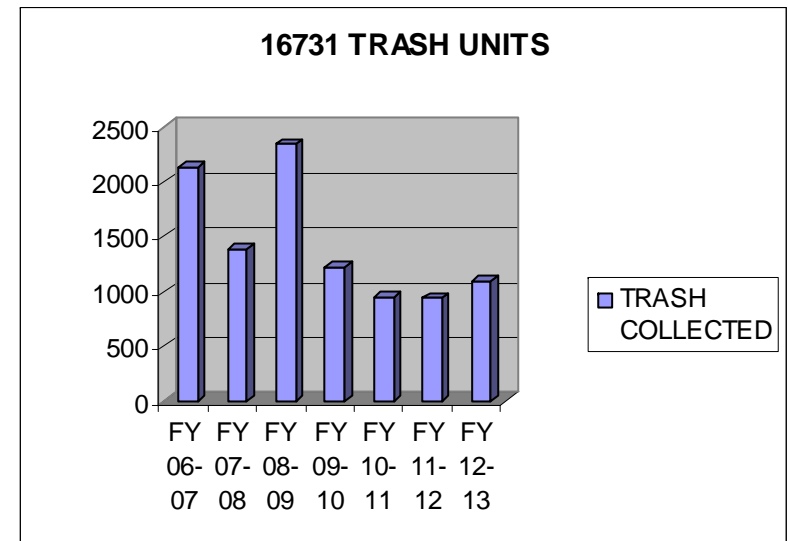




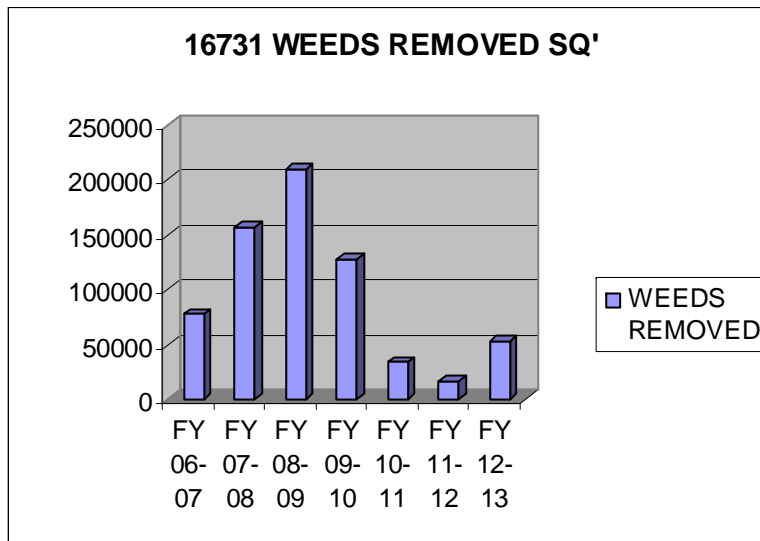
# Guardrails

- 60 sections out of a 113 sections of guardrails were inspected.
- Transferred City rail inventory (excel) to a shape file.

# Trash Abatement

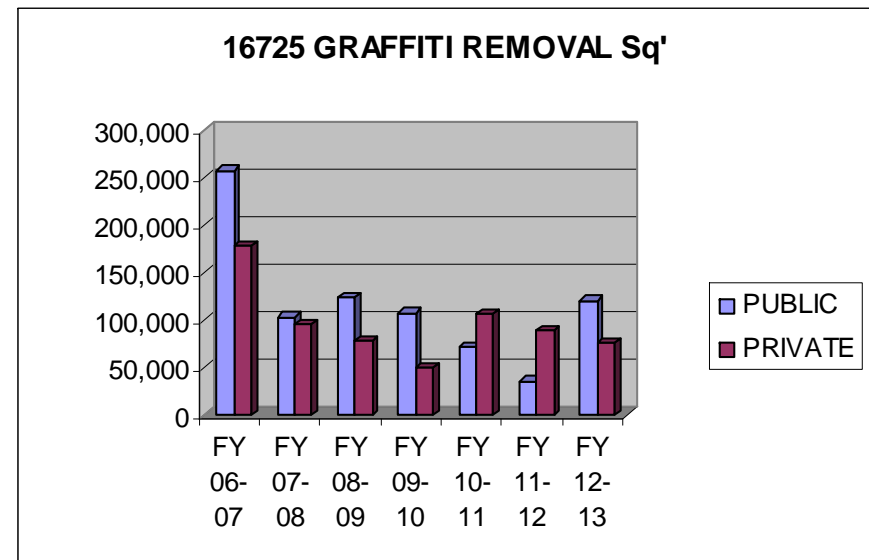


# Weed Abatement



# Graffiti Removal

- ◆ On avg. 93,415 sq' public graffiti removed yearly
- ◆ On avg. 70,755 sq' private graffiti removed yearly
- ◆ Approx. 37.5% decrease in graffiti removal yearly from previous years



# Management Strategy Example

- Street Lights
  - Replace every 50 years
- Traffic Signal System
  - Replace every 50 years
  - Upgrade controller every 15 years
- Sidewalks
  - Replace every 75 years
  - Minor rehabilitation (grinding and/or asphalt patching) at uplift 0.25 in or more
  - Major rehabilitation (panel replacement) as needed

# Life Expectancy

Asset Type	Recommended Life Expectancy
Curb & Gutter	50
Medians	50
Sidewalks	50
Driveway Approaches	50
Street Lights	50
Traffic Signal Systems	50
Pedestrian Ramps	50
Parkways	50
Bridges	75
Parking Meters	25
Traffic Signs	8
Guardrails	35

# Life Expectancy – Pavement Marking & Striping

Pavement Marking and Striping Material	Recommended Life Expectancy
School paint	1
School plastic	2
Paint	5
Plastic	10
Ceramics	7
Paint w/ Ceramics	5
Markers	5
Other	5

# Life Expectancy – Parking Lot Assets

Parking Lot Assets	Recommended Life Expectancy
Bollard	30
Trash Bin	15
Asphalt Pavement	30
Concrete Pavement	50
Pay Machine	25
Lighting	25
Bench	20
Fencing	25

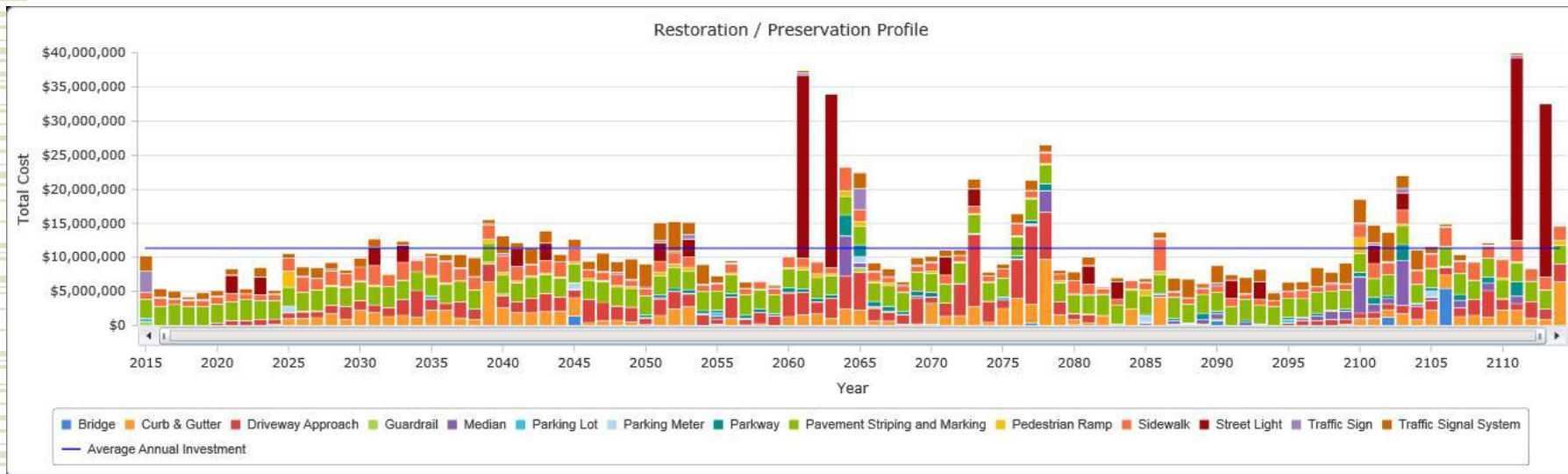
# Asset Type CoF

Asset Type	Economic	Social			Environmental	Final CoF
	Economic Impact	Loss of Service	Safety	City's Image	Environmental Impact	
Weight 1	24%	23%	24%	24%	5%	
Bridges	5	4	5	5	4	5
Traffic Signal Systems	4	5	5	3	2	4
Sidewalks	3	2	4	3	1	3
Guardrails	1	3	5	3	1	3
Pavement Striping and Marking	2	2	4	3	1	3
Street Lights	3	2	4	2	1	3
Parking Lots	4	3	1	3	1	3
Traffic Signs	2	3	4	2	1	3
Pedestrian Ramps	2	2	3	3	1	2
Curb & Gutter	2	2	2	3	4	2
Driveway Approaches	3	2	2	2	1	2
Parking Meters	3	3	1	1	1	2
Medians & Median Curbs	2	2	2	1	1	2
Parkways	1	1	1	3	1	1

Asset Types & Asset Classes		Criticality Assessment		Management Strategies		
Asset Type	Asset Class	Additional Categories for Criticality	Criticality within Asset Classes (1-5)	Useful Life		
Curb & Gutter	Six Lane Prime Arterial		5	50		
	Six Lane Major Arterial		5	50		
	Four Lane Major Arterial		4	50		
	Class I Collector		3	50		
	Class II Collector		2	50		
	Residential		1	50		
Median Curbs	Six Lane Prime Arterial		5	50		
	Six Lane Major Arterial		5	50		
	Four Lane Major Arterial		4	50		
	Class I Collector		3	50		
	Class II Collector		2	50		
	Residential		1	50		
Medians	Six Lane Prime Arterial		5	50		
	Six Lane Major Arterial		5	50		
	Four Lane Major Arterial		4	50		
	Class I Collector		3	50		
	Class II Collector		2	50		
	Residential		1	50		
	Sidewalks	Sidewalk			50	
Driveway Approaches	Driveway Approach	Six Lane Prime Arterial	5	50		
		Six Lane Major Arterial	5			
		Four Lane Major Arterial	4			
		Class I Collector	3			
		Class II Collector	2			
		Residential	1			
Pavement Striping & Markings	Striping-School_Paint	Six Lane Prime Arterial	5	1		
	Striping-School_Plastic	Six Lane Major Arterial	5	2		
	Striping-Paint	Four Lane Major Arterial	4	5		
	Striping-Plastic	Class I Collector	3	10		
	Striping-Ceramics	Class II Collector	2	7		
	Striping-Pnt w Cer	Residential	1	5		
	Striping-Pnt w Mar			5		
	Striping-Markers			5		
	Striping-Other			5		
	Marking-School_Paint			1		
	Marking-School_Plastic			2		
	Marking-Paint			5		
	Marking-Plastic			10		
	Marking-Ceramics			7		
	Marking-Pnt w Cer			5		
	Marking-Pnt w Mar			5		
	Marking-Markers			5		
	Marking-Others			5		
	Street Lights	Single	Arterial		50	
		Double	Collector		50	
Traffic Signal Systems		Residential		50		
	Signal_6-6			50		
	Signal_6-4			50		
	Signal_6-2			50		
	Signal_4-4			50		
	Signal_4-2			50		
	Signal_2-2			50		
	Pedestrian Ramps	Ped_Ramp	Residential	5	50	
Class II Collector			5			
Class I Collector			5			
Four Lane Major Arterial			4			
Six Lane Major Arterial			4			
Six Lane Prime Arterial			3			
Parkways			Parkway			50
Bridges	Bridge			75		
	Pedestrian Bridge			75		
Parking Meters	Single			25		
	Double			25		
Parking Lots	Bollard		1	30		
	Trash Bin		1	15		
	Asphalt Pavement		4	30		
	Concrete Pavement		4	50		
	Pay Machine		5	25		
	Lighting		4	25		
	Bench		2	20		
	Fencing		2	25		
	Traffic Signs	Traffic Sign	Regulatory	5	Until Mandate	
			Warning	4		
School			4			
Guide			2			
Other			1			
Guardrails			Guardrails			35

# Annual Investment Need

**Total Annualized R&P: \$16.0 M**



# Catch Up

- ◆ \$27.1 M
  - Includes
    - Bridge
    - Pavement Striping and Marking
    - Pedestrian Ramp
    - Sidewalk
    - Traffic Sign
    - Traffic Signal System



**OPEN SPACE  
To Be Continued...**

A decorative graphic on the left side of the slide consists of a series of thin, horizontal, light-colored lines. To the right of these lines, there are two vertical bars: a taller one on the left and a shorter one on the right, both in a light olive green color. A dark blue horizontal line spans the width of the slide, positioned above the text. Another dark blue horizontal line is positioned below the first one, starting from the center and ending at the right edge, with a light olive green rectangular block at its right end.

# **GENERAL GOVERNMENT To Be Continued...**

# AMP Assessment

Asset Management Systems	Asset Inventory	Condition Assessment	Risk Assessment	Life Cycle Costing	Catch Up	Keep Up	Moving Forward	Technical Committee Review
Building Management System	●	●	●	●	●	●	●	●
Drainage Management System	●	●	●	●	●	●	●	●
Fleet Management System	●	●	●	●	●	●	●	●
General Gov't Management System	●	●	●	●	●	●	●	●
Open Space Management System	●	●	●	●	●	●	●	●
Parks Management System	●	●	●	●	●	●	●	●
Roadway Management System	●	●	●	●	●	●	●	●
Urban Forestry Management System	●	●	●	●	●	●	●	●
Wastewater Management System	●	●	●	●	●	●	●	●